



# **MI's Wind Energy Experience: Separating Fact from Fiction**

by  
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**Interstate Informed Citizen's Coalition, Inc.  
Blissfield, MI**

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**[www.iiccusa.org](http://www.iiccusa.org)**

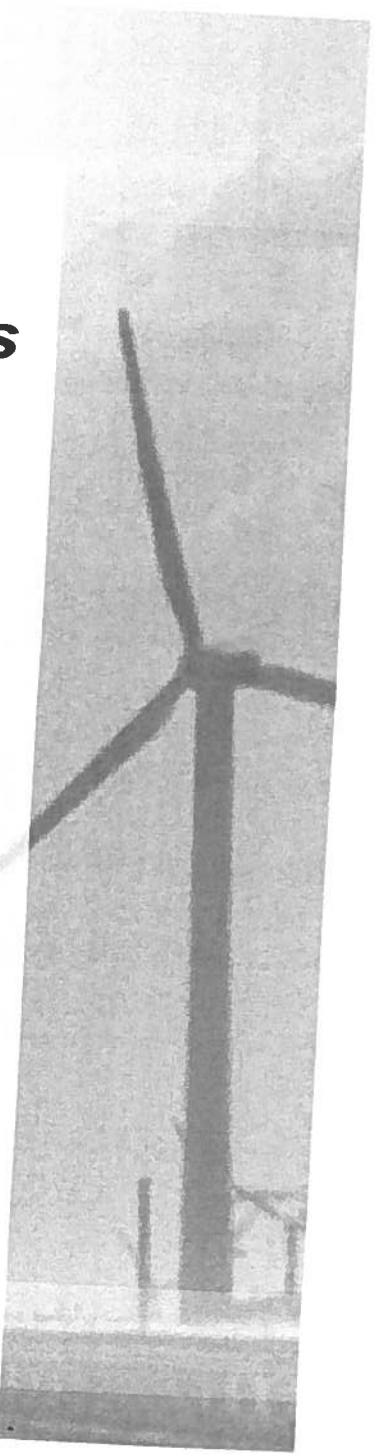
# **Who is the IICC?**

***The IICC is a bi-partisan renewable energy citizen's watchdog group based in Blissfield, MI.***

***Our constituents are approximately 40% Democratic & 60% Republican. They range from self-identified liberal environmentalists to free-market libertarians.***

***Many of our supporters live on the front lines of industrial wind development in the State of Michigan.***

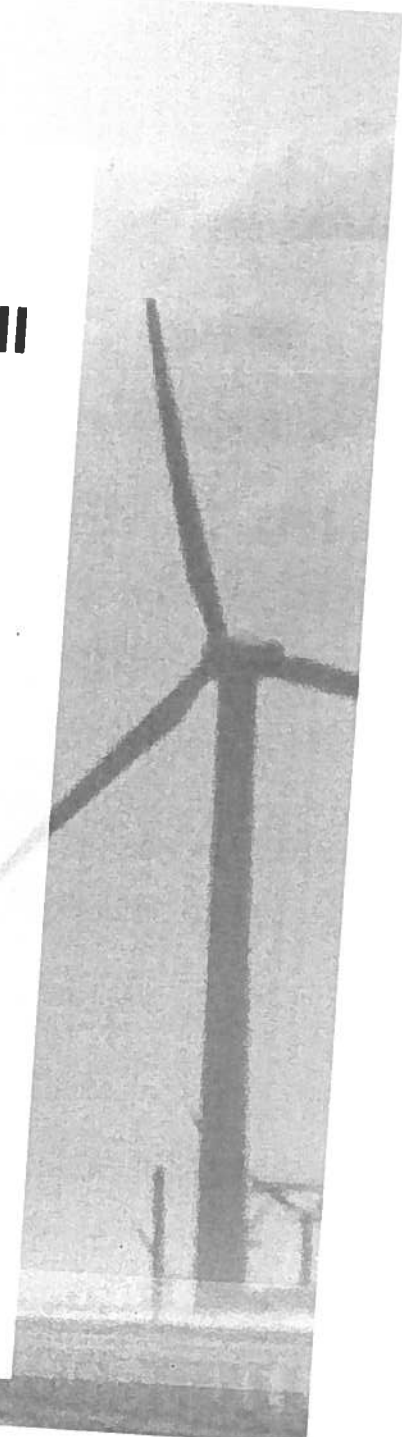
***We seek energy policy that is affordable, reliable and socially and environmentally responsible.***



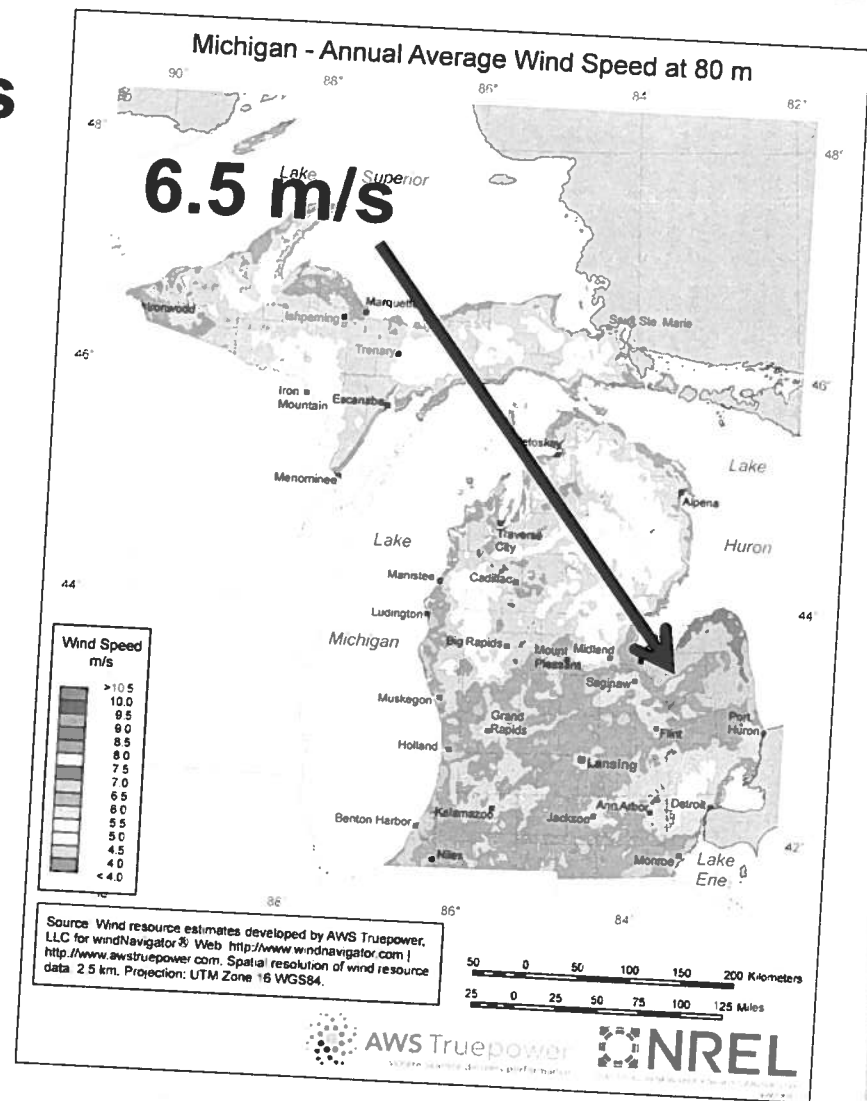
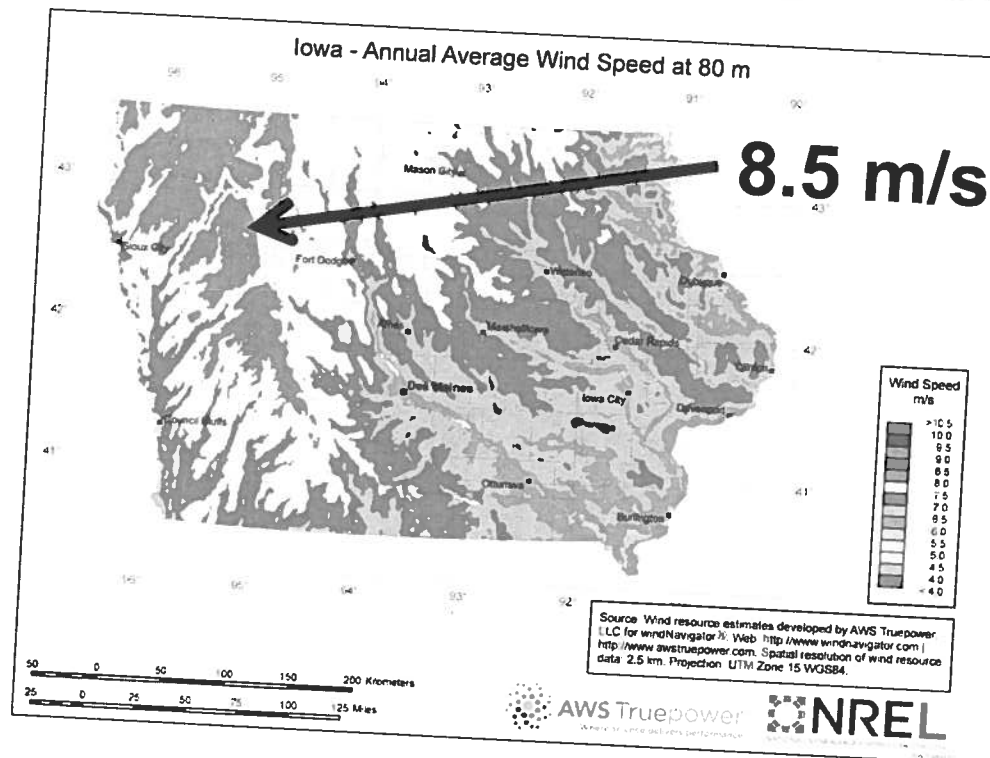
## **Myth 1:**

**“It is in the best interest of the State to require all qualifying renewable generation to be constructed within Michigan.”**

**Typical justifications are emissions avoidance, job creation and the development of a Michigan-based “green” manufacturing industry.**



# 1st. problem: MI wind noncompetitive

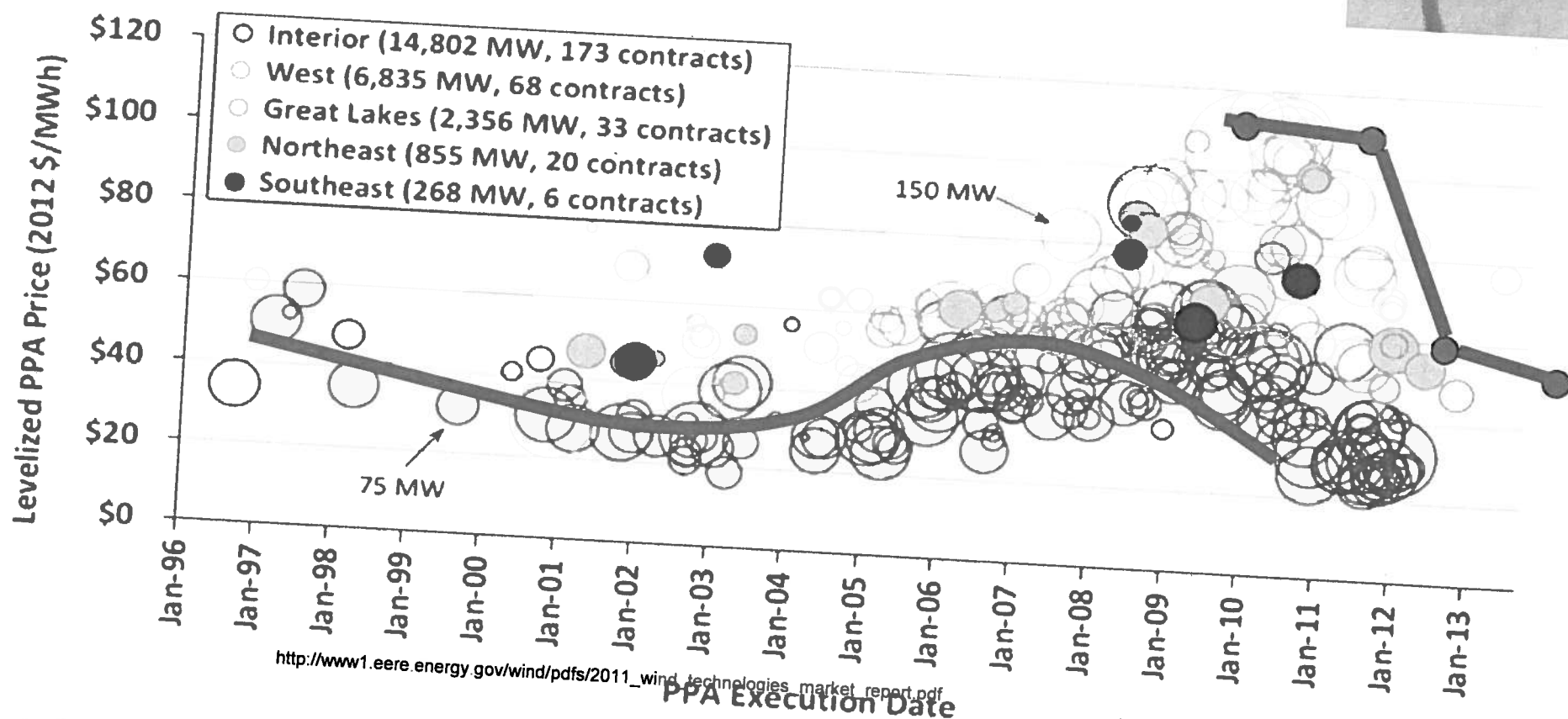


IA has large regions of 8.5m/s wind potential. MI has none, even @ 100m.

IA will produce ~2x the energy from each turbine as MI, a permanent 2:1 price disadvantage for MI

# Are new taller turbines more competitive?

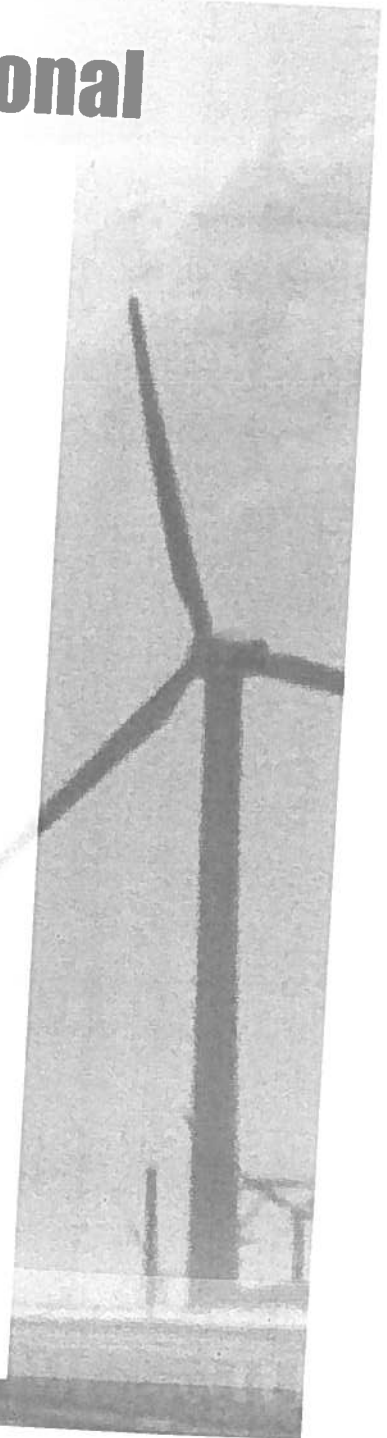
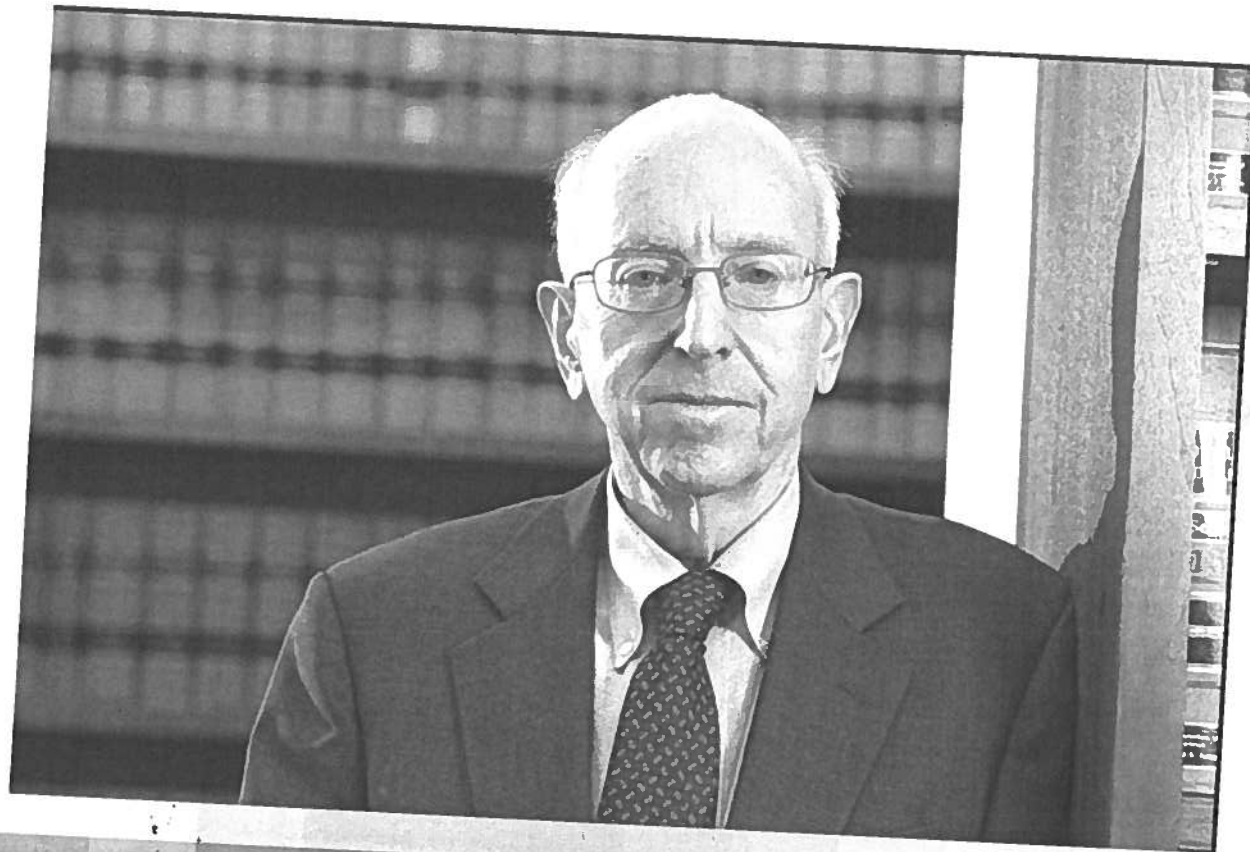
**No. Any technological advancement in low-wind turbine designs brings even greater benefits to high-wind areas like IA and MN.**



Note: Size of "bubble" is proportional to project nameplate capacity.

## **2<sup>nd</sup>. Problem: Instate Mandates Unconstitutional**

**"Michigan cannot, without violating the commerce clause of Article I of the Constitution, discriminate against out-of-state renewable energy." –Hon. Richard Posner, 7<sup>th</sup> Circuit**





## **Ohio concurs:**

**Not only has Ohio frozen both their EE and RE mandates in order to review the policies, they have permanently eliminated the instate requirement for renewable energy.**

***Senator Bill Seitz, Chairman of the Senate Public Utilities Committee led the charge.***

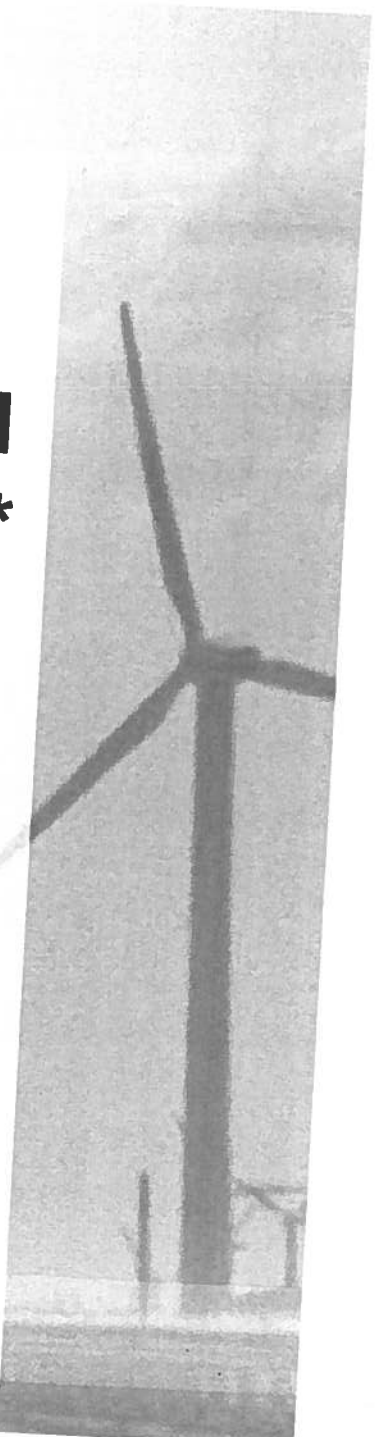
***His efforts enjoyed the support of AEP, Duke, FirstEnergy, OH Chamber, IEU and hundreds of others.***



## **Result:**

**Instate renewable energy mandates deprive MI utilities, cooperatives (and thus ratepayers) of their constitutional right to acquire (subsidized) \$22/MWh\* Iowa wind and forcing them to buy \$50/MWh (\$75/MWh fleet average) MI wind instead.**

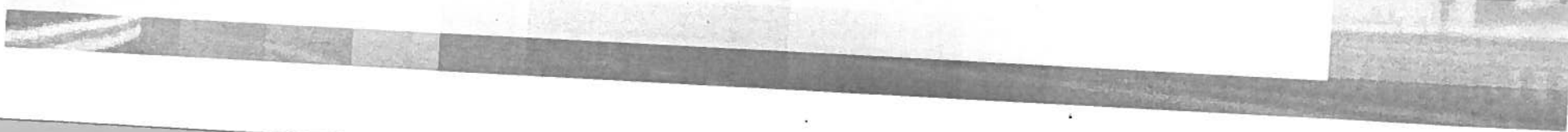
\*[http://emp.lbl.gov/sites/all/files/2013\\_Wind\\_Technologies\\_Market\\_Report\\_Final3.pdf](http://emp.lbl.gov/sites/all/files/2013_Wind_Technologies_Market_Report_Final3.pdf)





## **Myth 2:**

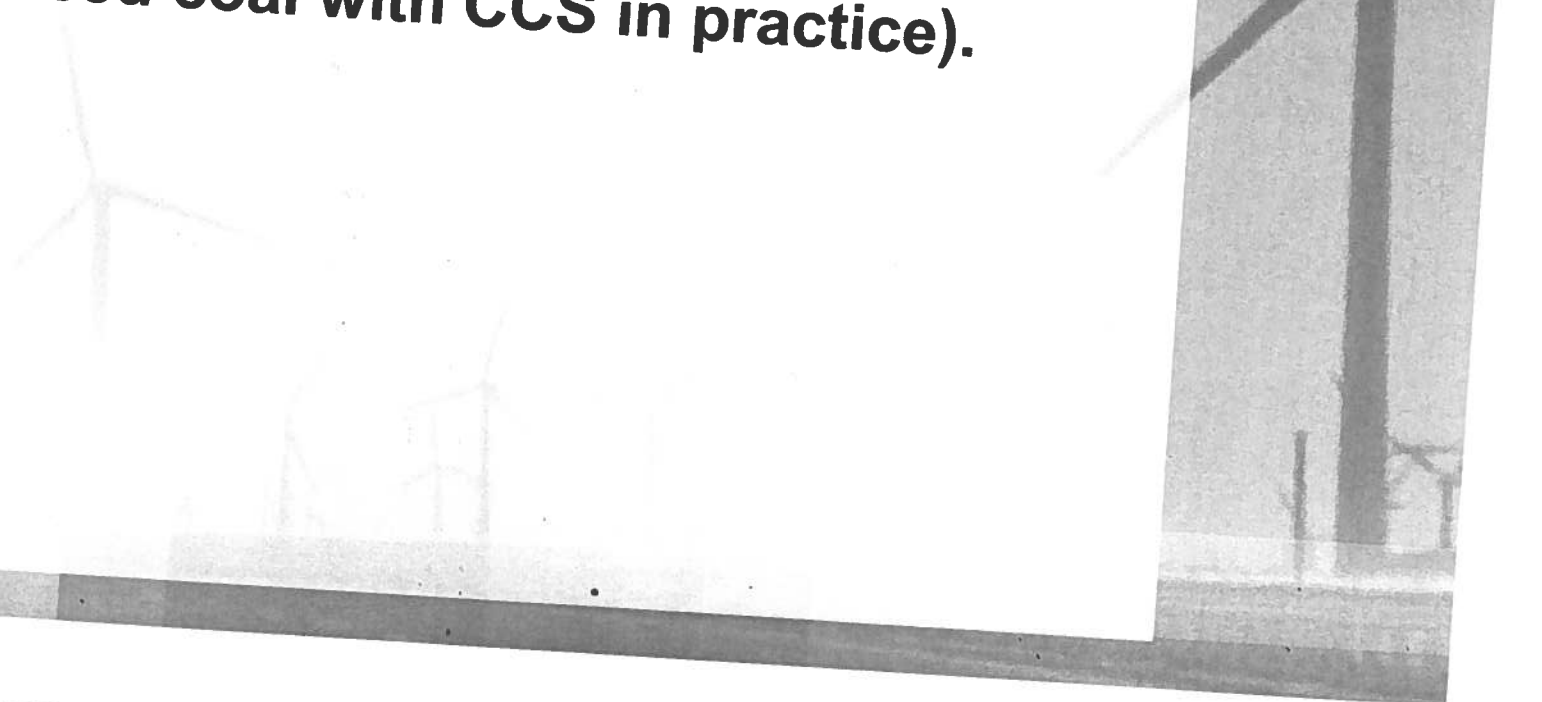
**“Wind energy is cheaper than coal.”**



## **MPSC PA295 Report:**

**Support for the idea that wind energy is cheaper than coal power comes from the annual Report on PA295 prepared by MPSC.**

**By statute, each year the report compares the Levelized Cost of Energy (LCOE) from wind turbines with the LCOE of a new coal plant (advanced coal with CCS in practice).**



# Consequence:

**As a result of this annual report, people are led to believe that wind energy is a cheap alternative to coal plants:**

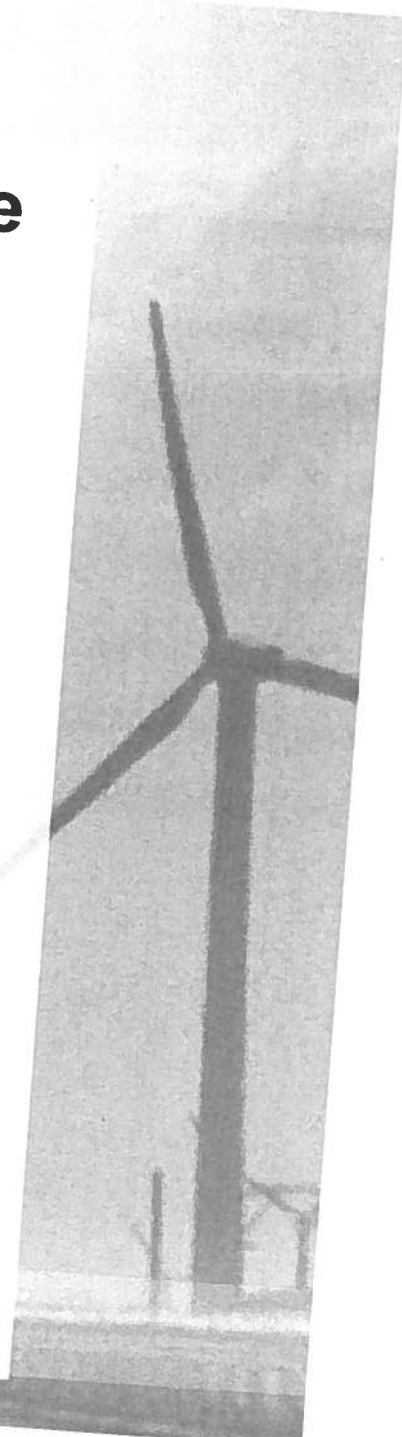
GREEN TECHNOLOGY, SOLAR POWER, WIND ENERGY

## REPORT SHOWS MICHIGAN WIND POWER NOW CHEAPER THAN COAL

🕒 FEBRUARY 13, 2015 👤 ESDMATTROUSH 💬 LEAVE A COMMENT

LANSING — Renewable wind energy is now cheaper than electricity from coal, according to the Michigan Public Service Commission's fifth annual report on the state's renewable energy standard and its cost effectiveness.

The report shows the weighted average price of existing renewable energy contracts is \$76.55 per megawatt-hour, which the report noted was "significantly lower than the cost of coal-fired generation plants."



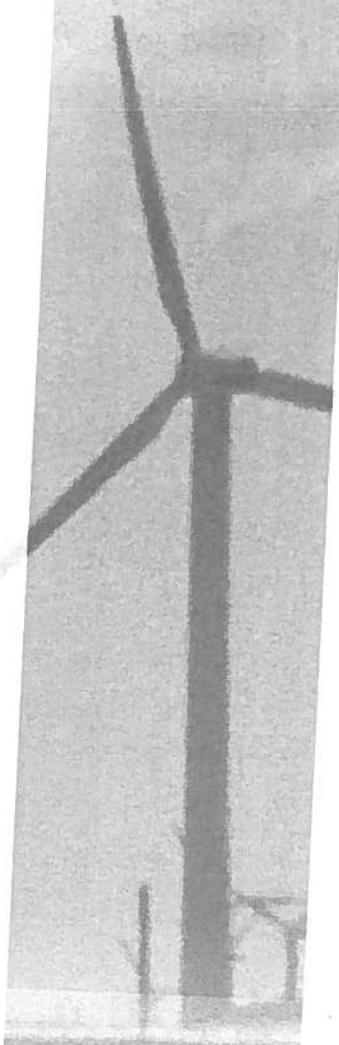
# Wind and coal energy also have different *value*.

**“...the production profiles for intermittent and dispatchable generation and the value of the electricity they produce are likely to be very different, making comparisons based on levelized cost alone meaningless”**

**Dr. Paul Joskow, MIT**

**COMPARING THE COSTS OF INTERMITTENT AND DISPATCHABLE ELECTRICITY GENERATING TECHNOLOGIES**

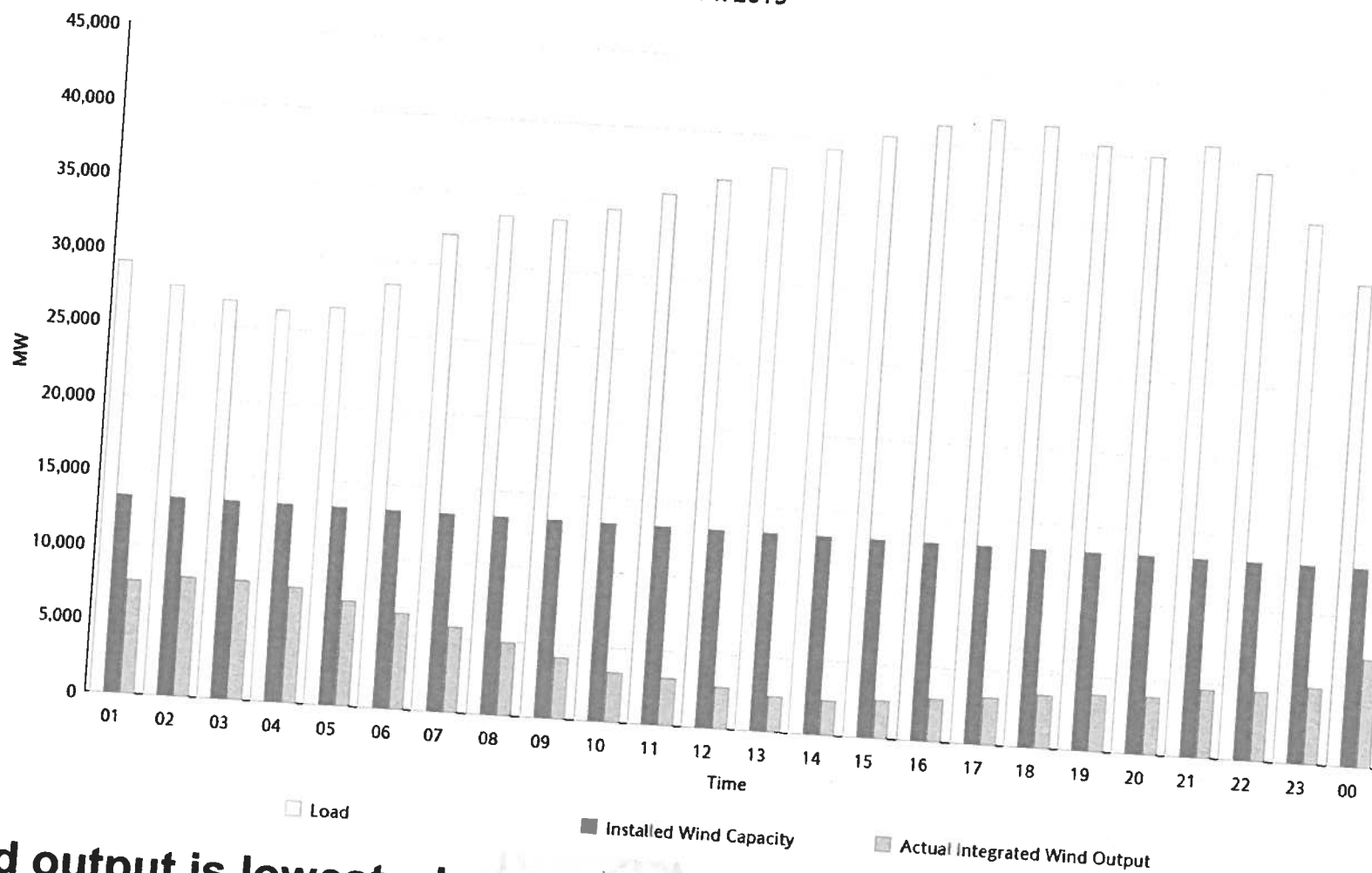
**.- [http://cadmus.eui.eu/bitstream/handle/1814/18239/RSCAS\\_2011\\_45.pdf?sequence=1](http://cadmus.eui.eu/bitstream/handle/1814/18239/RSCAS_2011_45.pdf?sequence=1)**



# ERCOT:

## Hourly Average Actual Load vs. Actual Wind Output

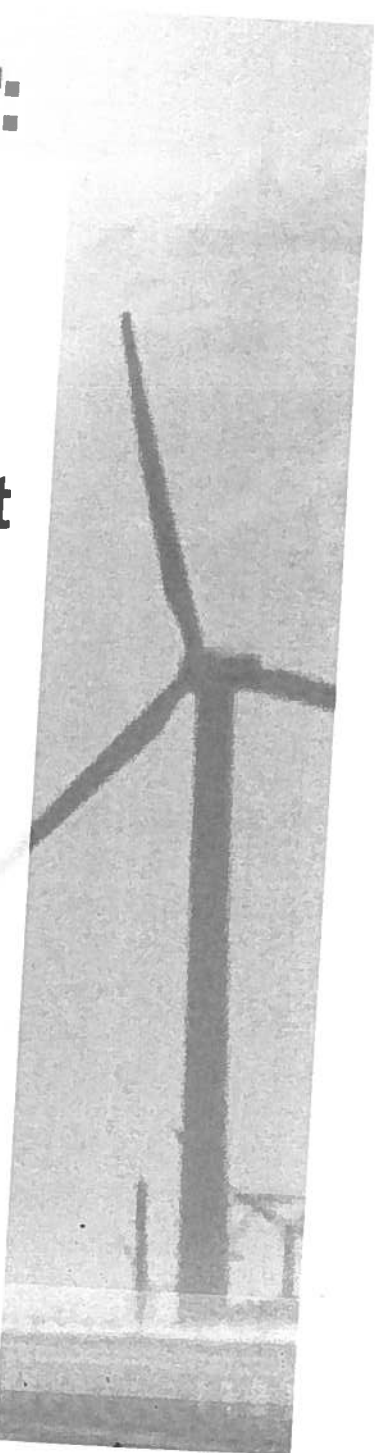
03/31/2015



**Wind output is lowest when energy is most valuable, and conversely.**

## **MPSC PA 295 reports now correct error:**

**“While the Commission is required to make a determination about the cost effectiveness of the renewable energy standard as compared to the life-cycle cost of electricity of coal-fired generation, it should be noted that renewable energy wind resources are not equivalent on a capacity basis when compared to coal-fired or other base load generation.”**





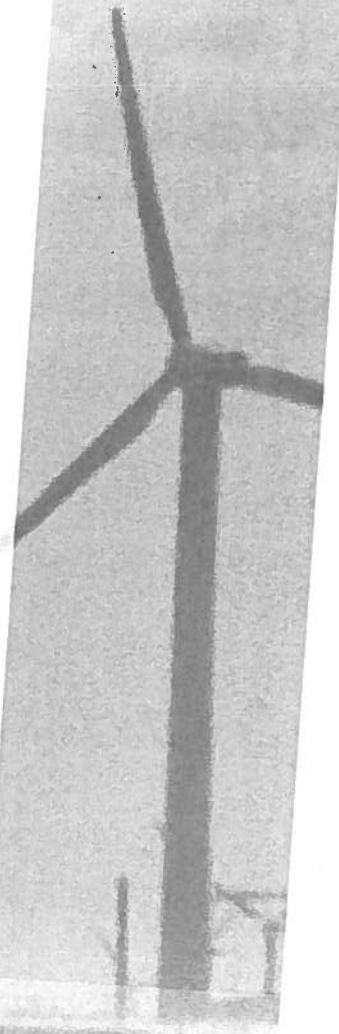
## **Accurate way to compare wind \$ with fossil \$:**

Wind turbines are not a replacement for fossil fuel plants. Wind turbines are merely a *fuel saving accessory* that can be added to existing fossil-fueled plants.

Michigan's average subsidized wind price is \$75/MWh. Adding subsidies and tax credits to this PPA price easily raises the unsubsidized average wind price to over \$100/MWh.

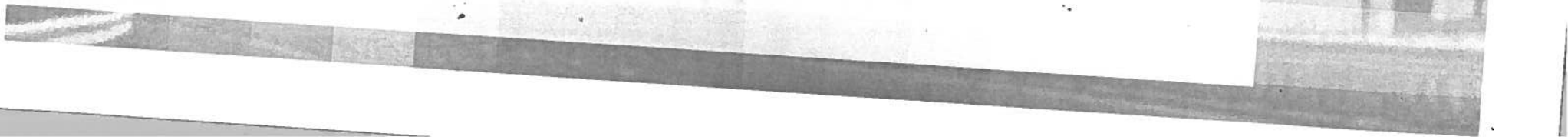
But the value of the fuel saved by adding wind to our portfolio is only ~\$25/MWh for coal or ~\$35/MWh for natural gas.

That is a poor value.



## **Myth 3**

**“Wind energy is an effective hedge against natural gas price volatility.”**

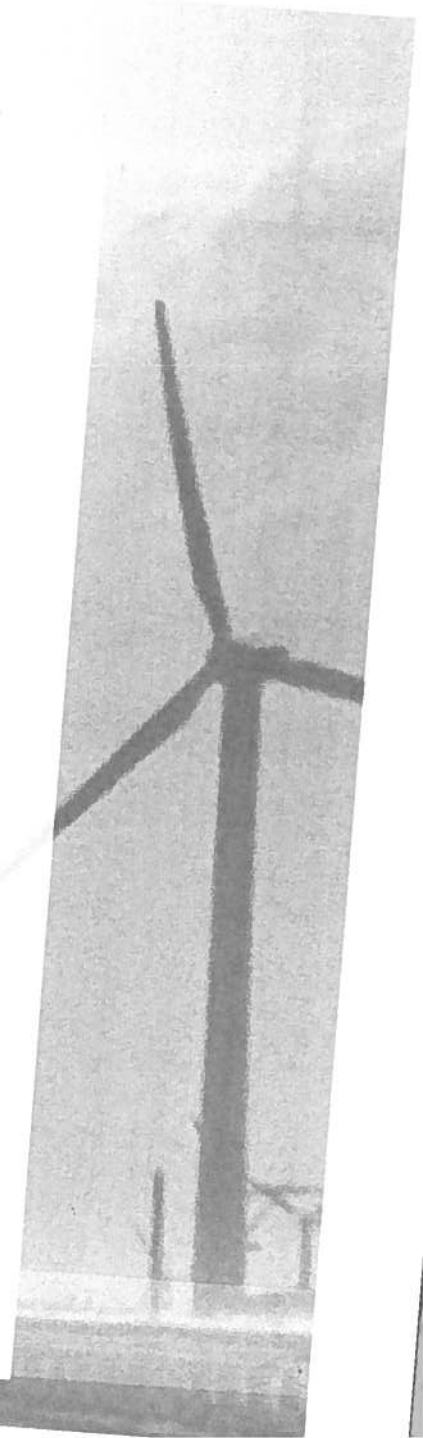


## **Basic misunderstanding:**

**Promoters of wind energy like us to believe that the choice before us is “wind or gas”.**

**But that is false.**

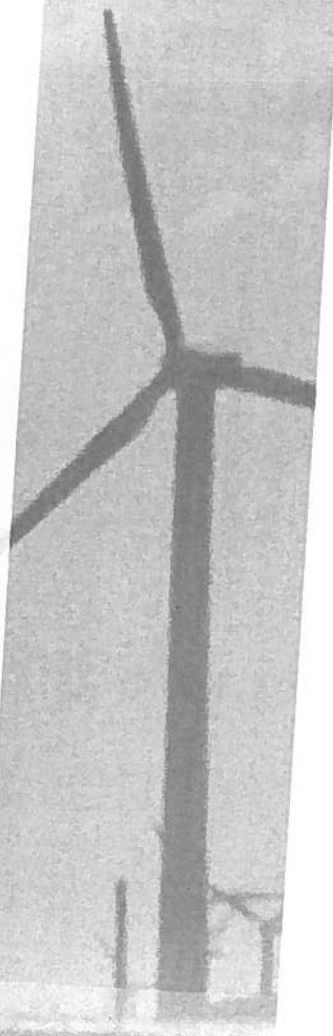
**Wind energy is largely dependent upon gas-fired generators for grid integration.**



## **AWEA on gas+wind as baseload:**

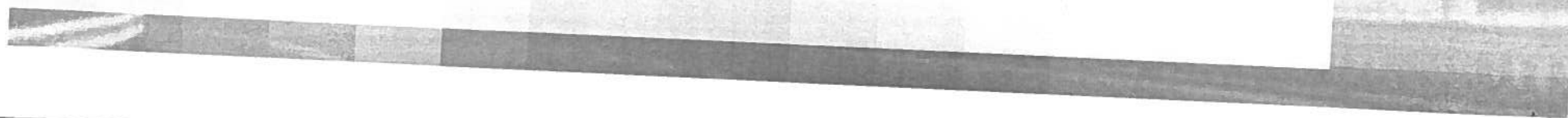
***“A combination of a large amount of renewable energy, combined with flexible natural gas plants and demand-response and efficiency, can ensure that our electric system has sufficient energy, capacity, and flexibility, and operates reliably....”***

[http://web.archive.org/web/20130511225107/http://www.awea.org/learnabout/publications/upload/Baseload\\_Factsheet.pdf](http://web.archive.org/web/20130511225107/http://www.awea.org/learnabout/publications/upload/Baseload_Factsheet.pdf)



## **What we know:**

***Wind energy's ability to penetrate the grid is determined by the presence of gas generators.***

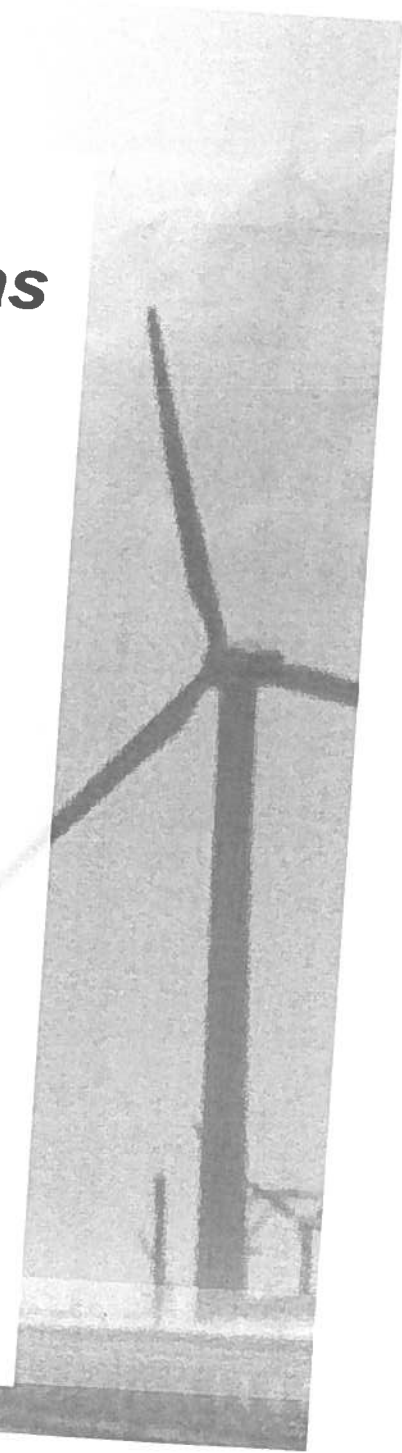


## **GE Explains:**

***“... if flexible generation assets, such as gas turbines, are not available, ...renewable technologies will not be deployed. In other words, gas turbines are an essential component of renewable energy sources’ ability to penetrate the market.”***

***-AWEA board member GE to White House***

[http://www.whitehouse.gov/sites/default/files/omb/assets/oira\\_2060/2060\\_07232013-1.pdf](http://www.whitehouse.gov/sites/default/files/omb/assets/oira_2060/2060_07232013-1.pdf)



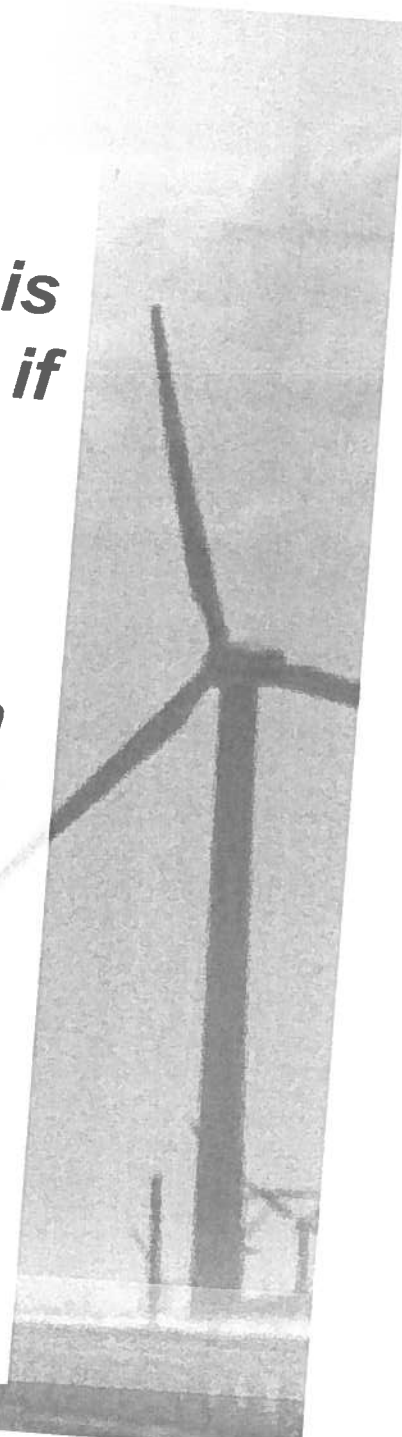


## **What's my point?**

**Unlike coal and nuclear power, wind energy is wholly dependent upon gas fired generation if substantial penetrations of wind are being deployed.**

**This means that the more wind generation in a given region the more gas generation that is required. More gas means more exposure to the gas market, not less.**

[http://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC-CAISO\\_VG\\_Assessment\\_Final.pdf](http://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC-CAISO_VG_Assessment_Final.pdf)

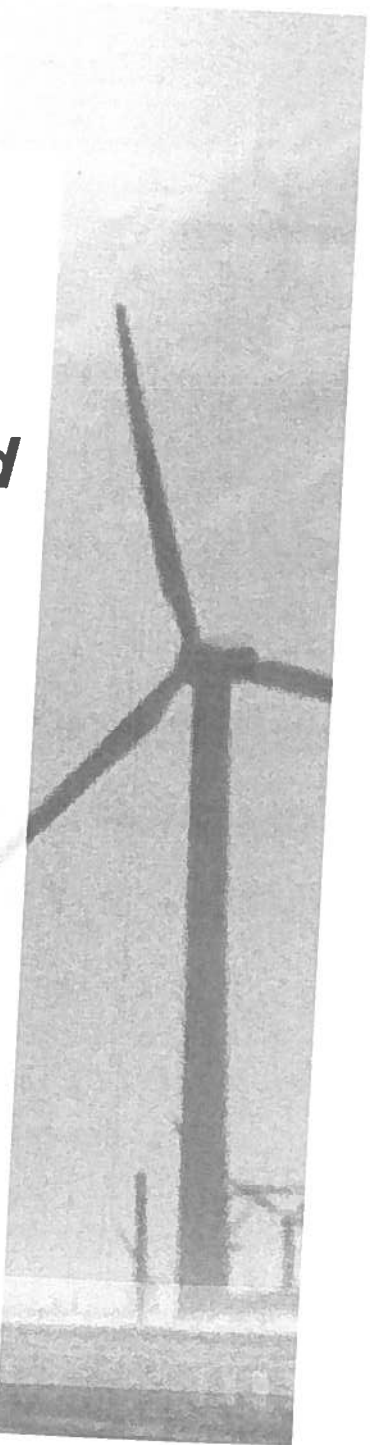


## **Caveat:**

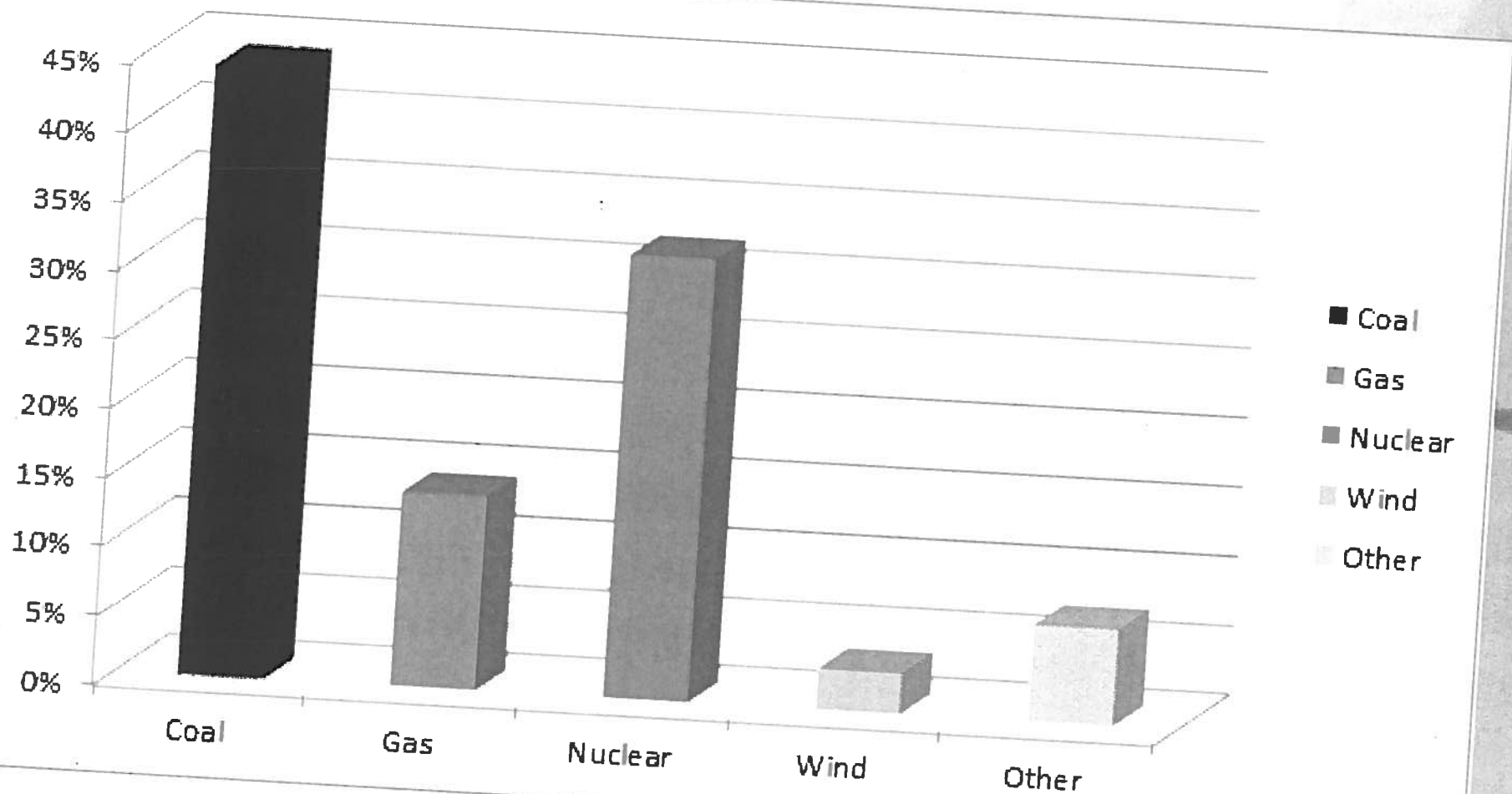
***The slides I am about to show you assume a MI ratio of 2 parts gas to 1 part wind. This ratio can vary with available transmission and the generation mix in nearby grid regions.***

***But the general theme is correct: for every unit of wind energy we mandate, we commit our ratepayers to deploying and maintaining two units of gas fired generation.***

***Thus a wind mandate is an even larger gas mandate.***

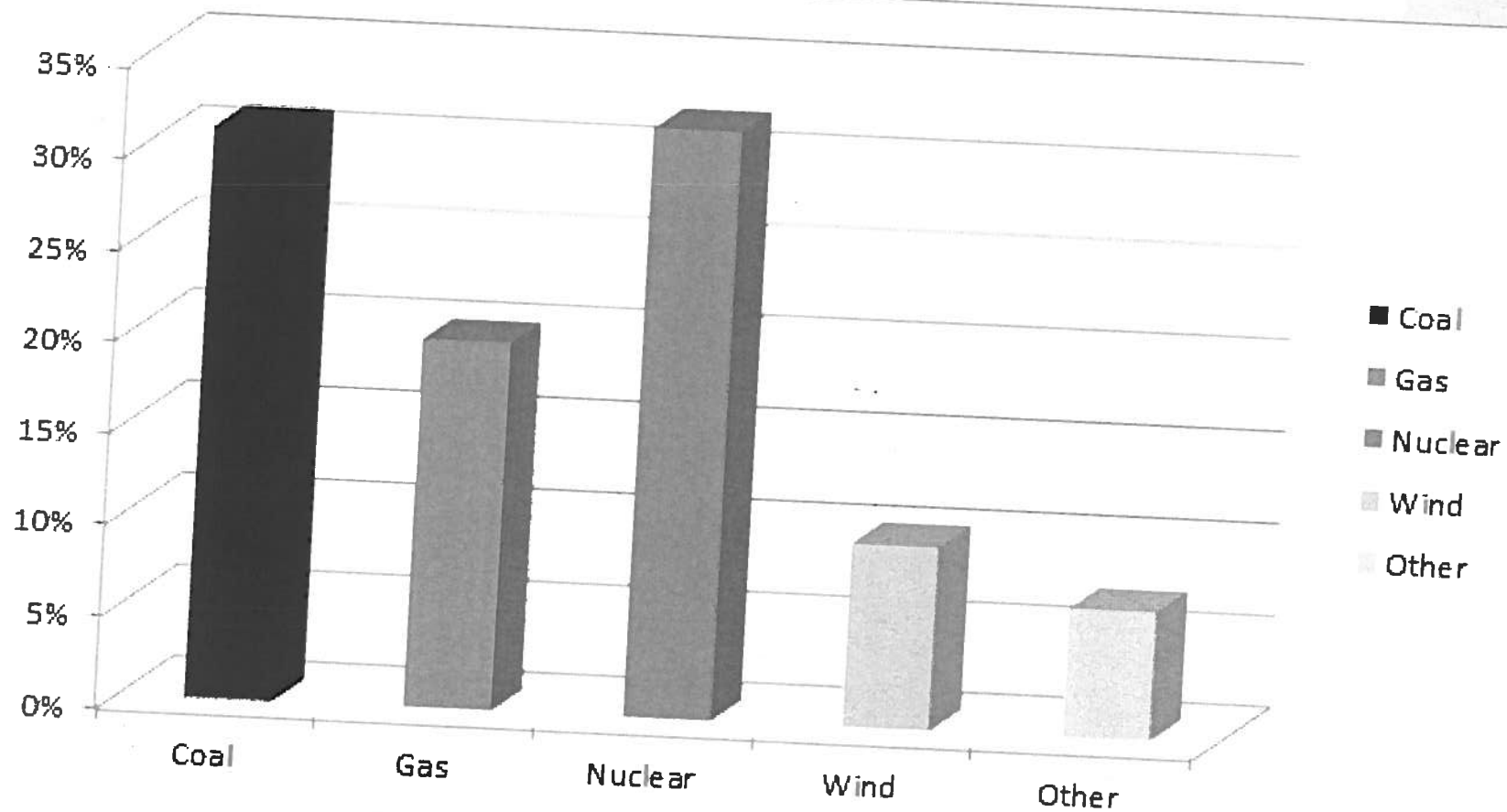


## MI 2014 Generation Profile:



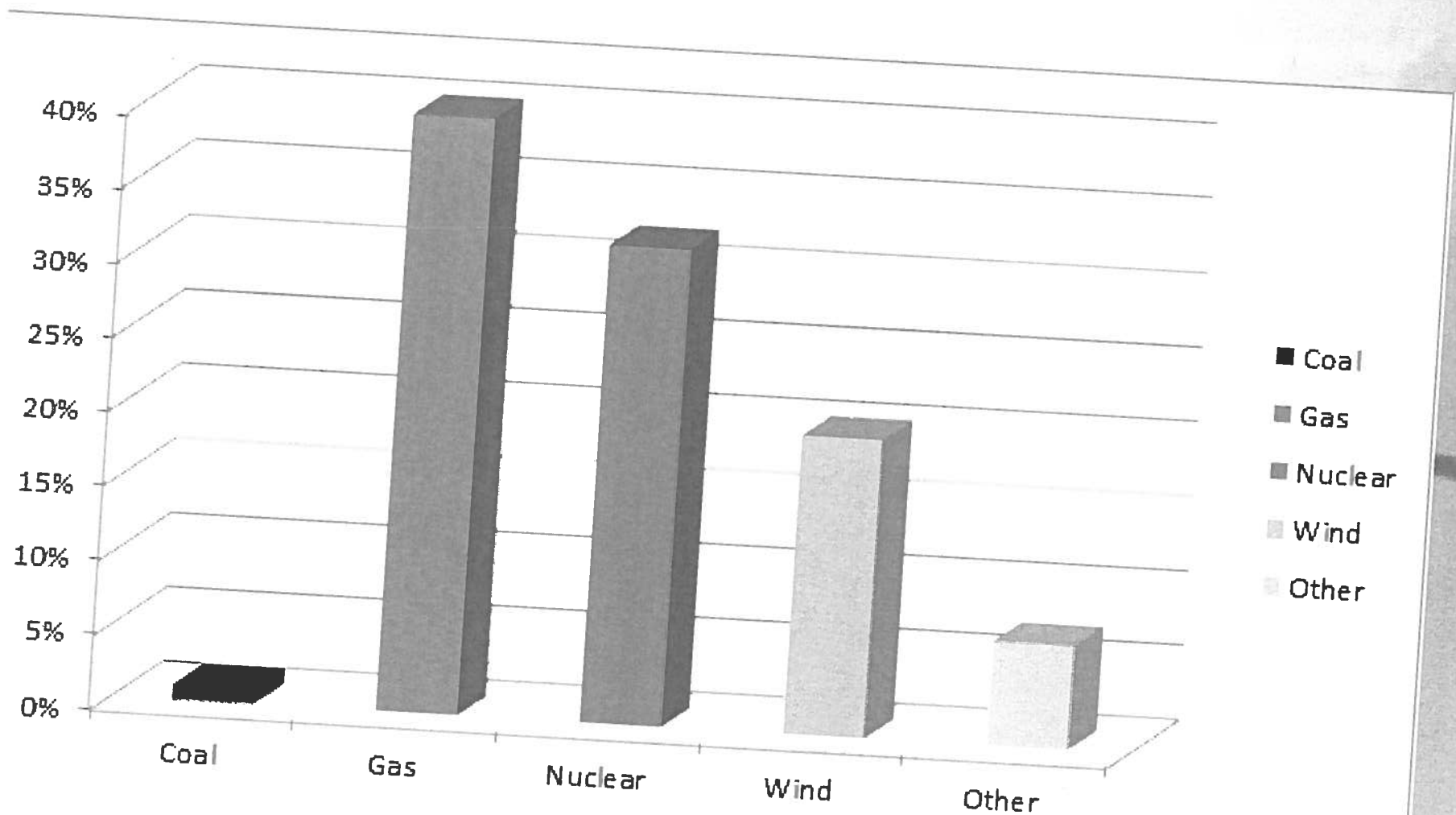
**44% coal, 14% gas, 32% nuke, 3% wind. 7% other**

## 10% wind:



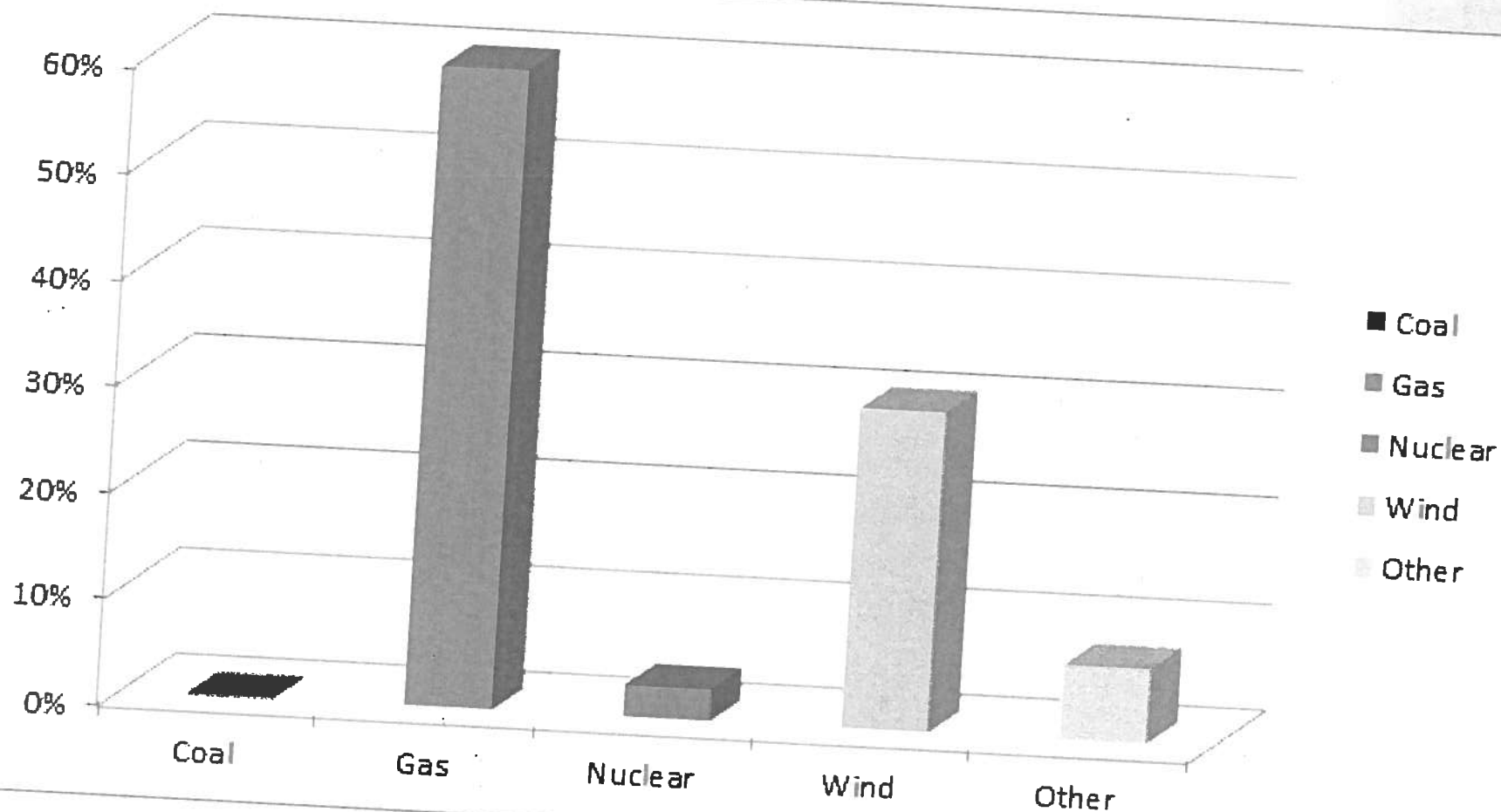
**30% coal, 20% gas, 32% nuke, 10% wind**

## 20% wind:



**1% coal, 40% gas, 32% nuke, 20% wind,**

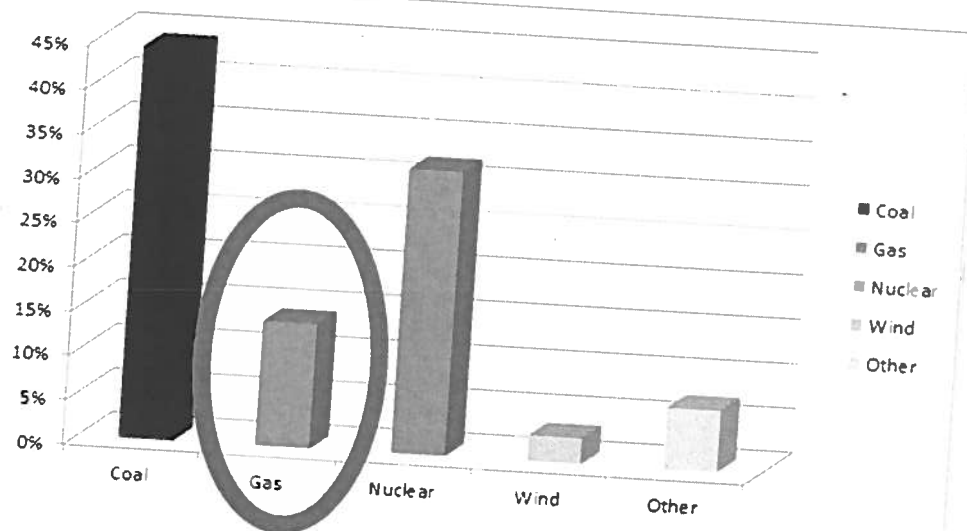
**30% wind:**



**0% coal, 60% gas, 3% nuke, 30% wind,**



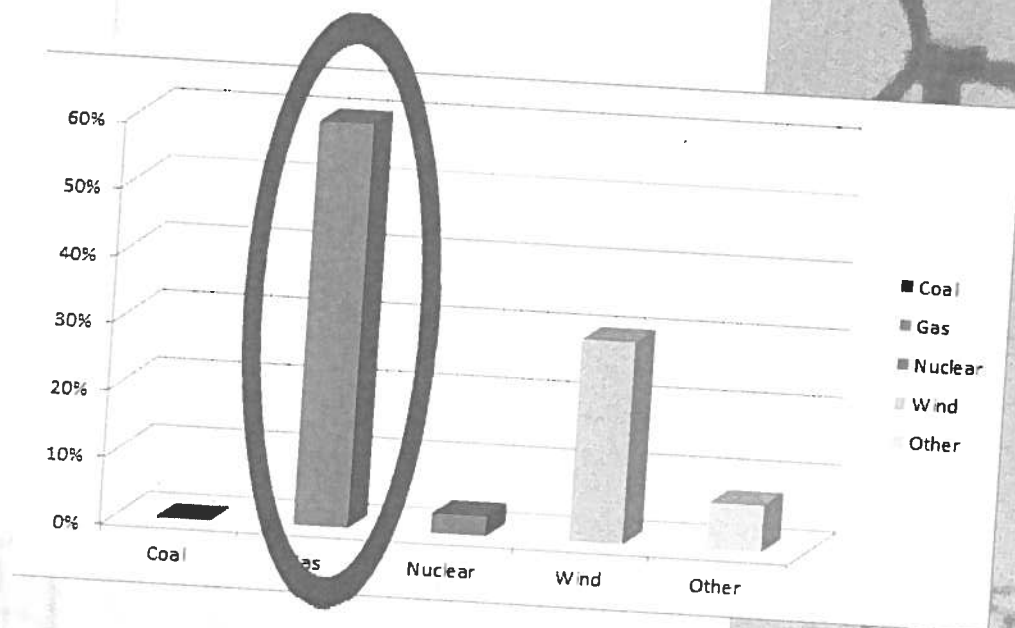
## BAU versus 30% wind:



**Our current profile...**

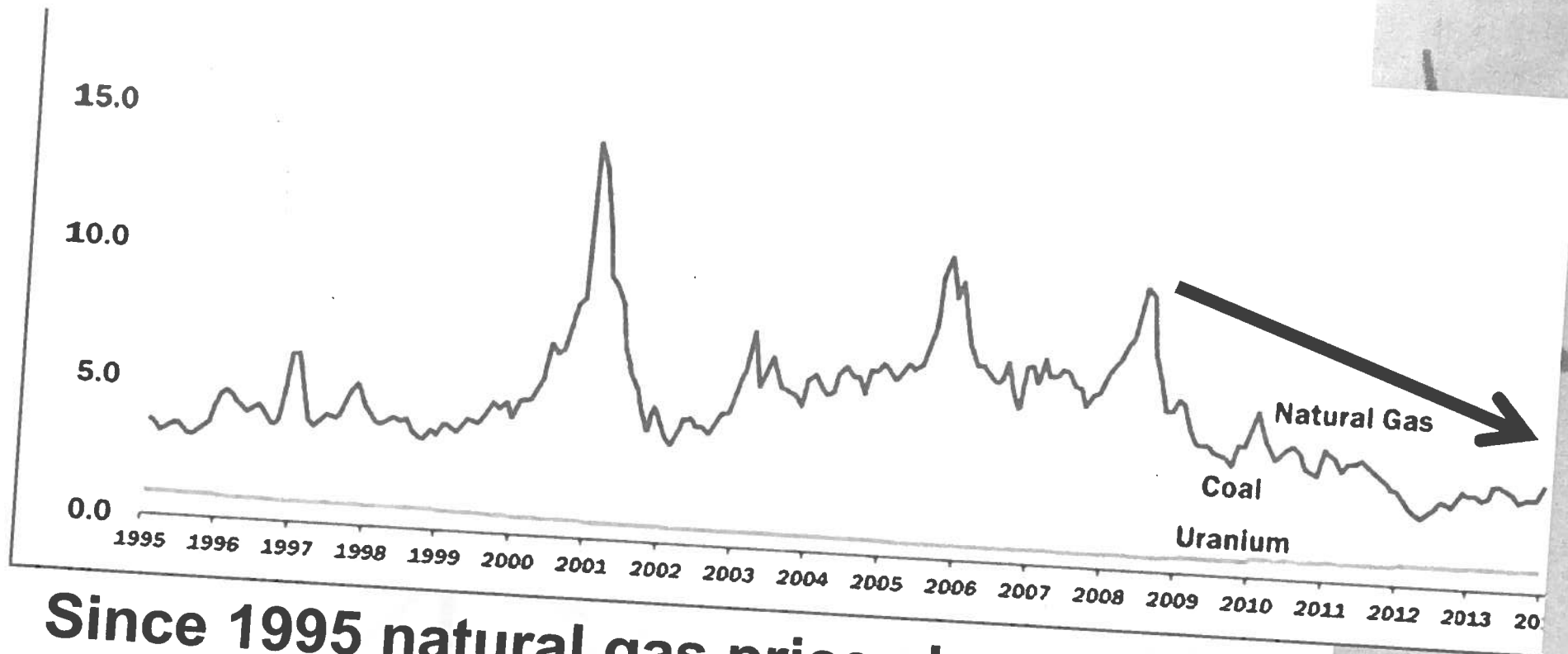
**30% wind could essentially quadruple our exposure to the gas market.**

**That is not a hedge.**



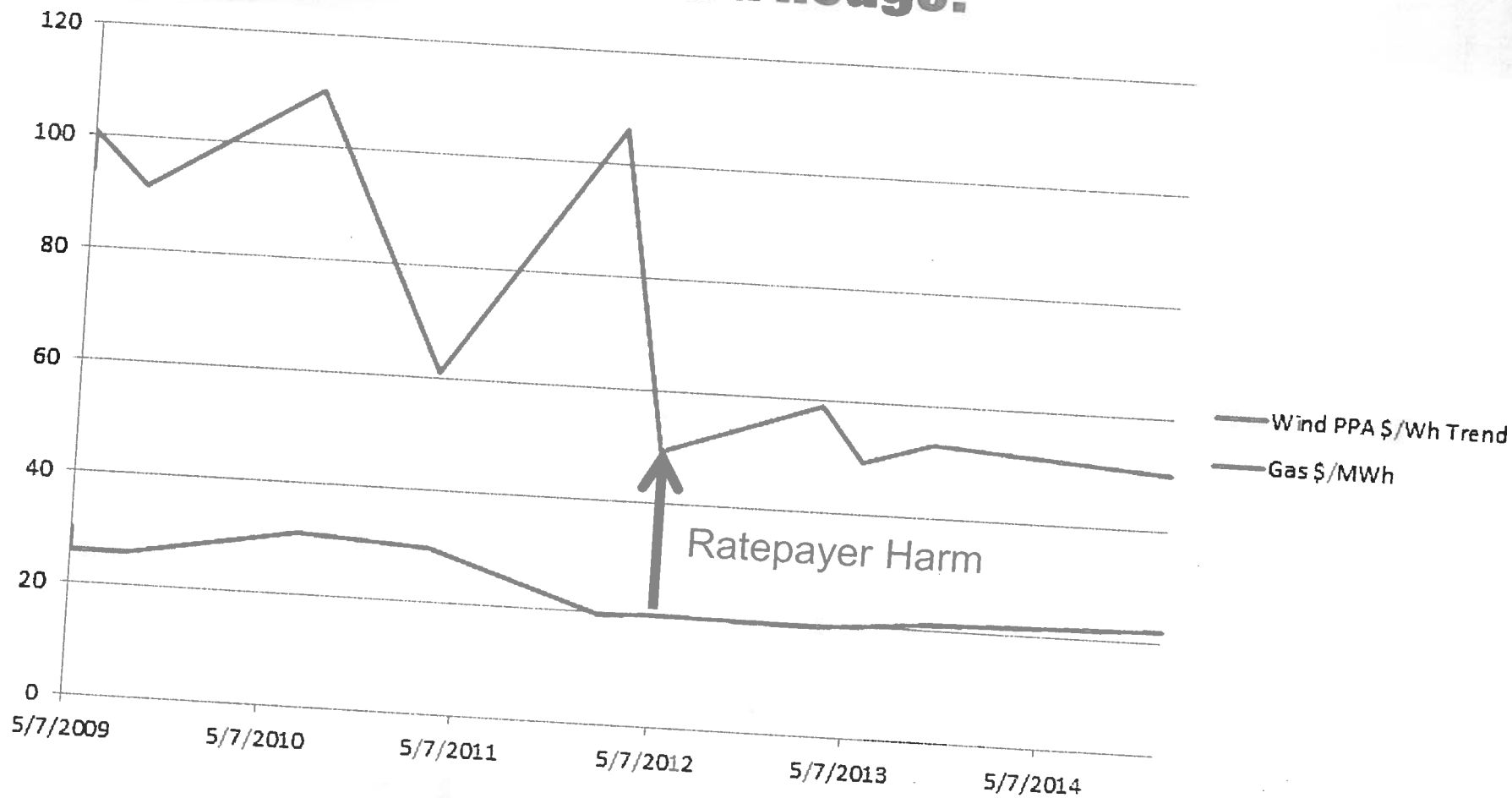
**...or 30% wind?**

## Fuel price trends:



Since 1995 natural gas prices have been volatile but trending downward, particularly since 2008 when PA295 was enacted.

## Looking back, was wind a hedge?

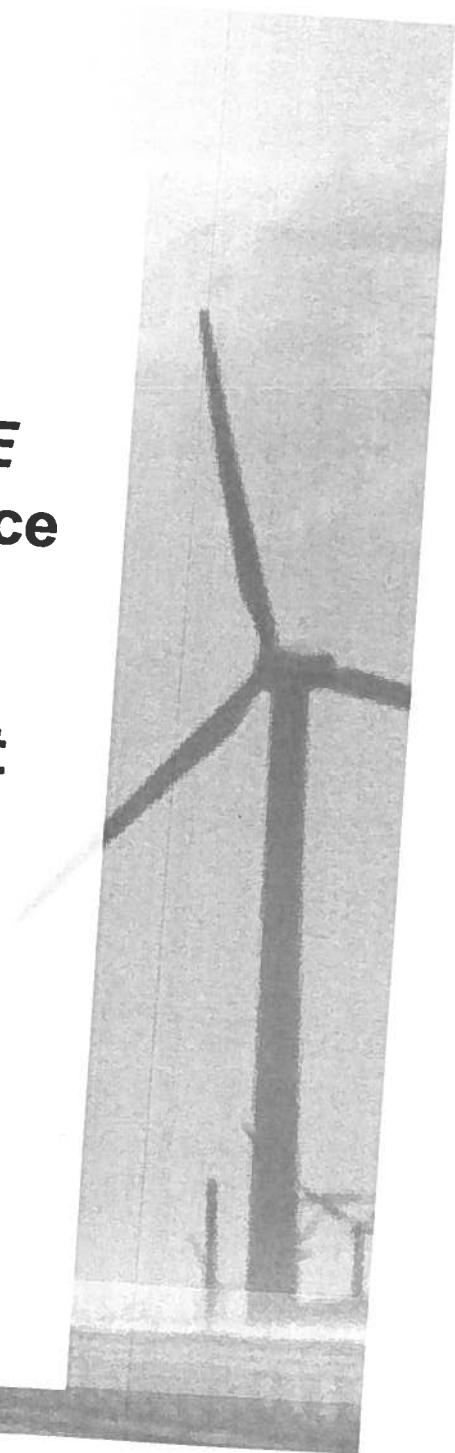


**At no point since 2008 has a subsidized MI wind PPA cost less than the gas fuel it has saved. In fact wind has cost ratepayers 2.5-5x the value of the gas fuel saved.**

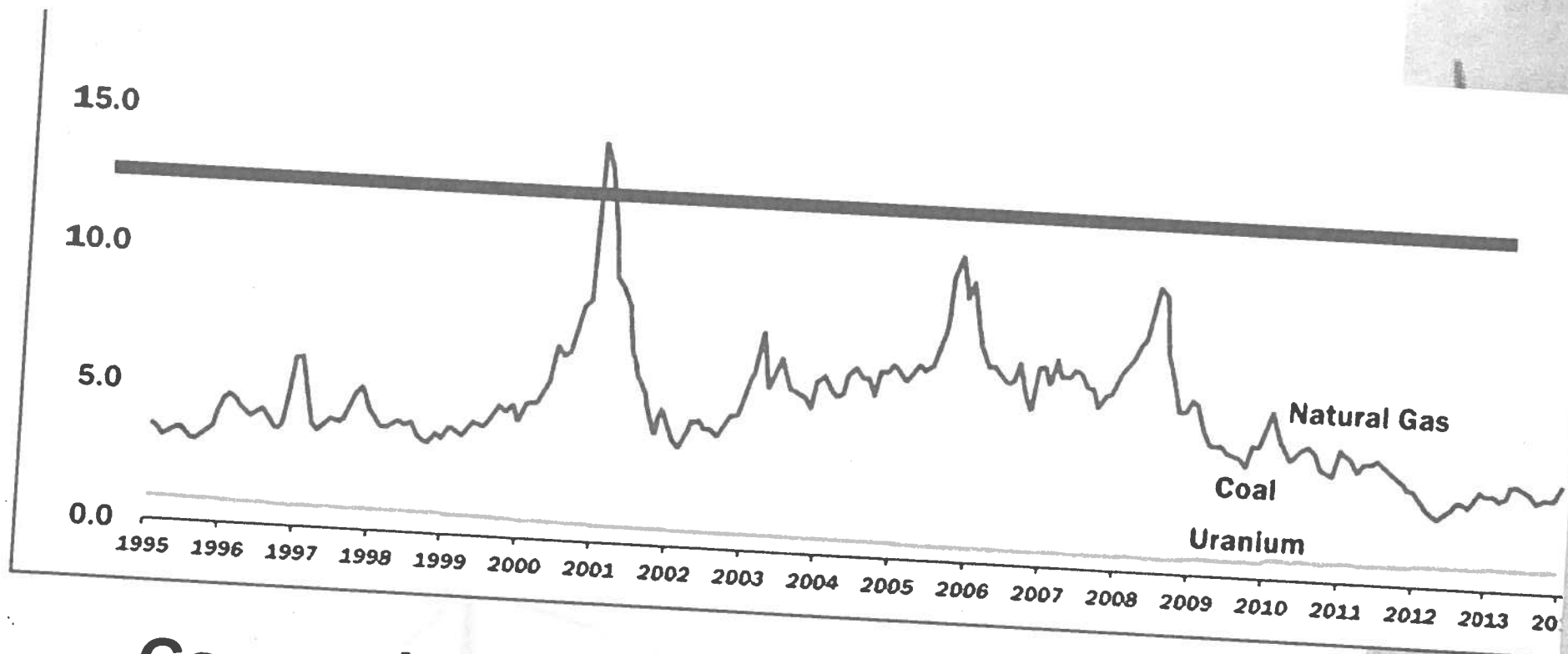
# **What about the PTC?**

**The 2015 Report on PA295 states that the *DTE Energy Meade* wind plant would have a PPA price of \$47-53/MWh.**

**But they also report that if the project does not qualify for the PTC the price would rise to \$80/MWh.**



# **\$80 Wind PPA a gas price hedge?**



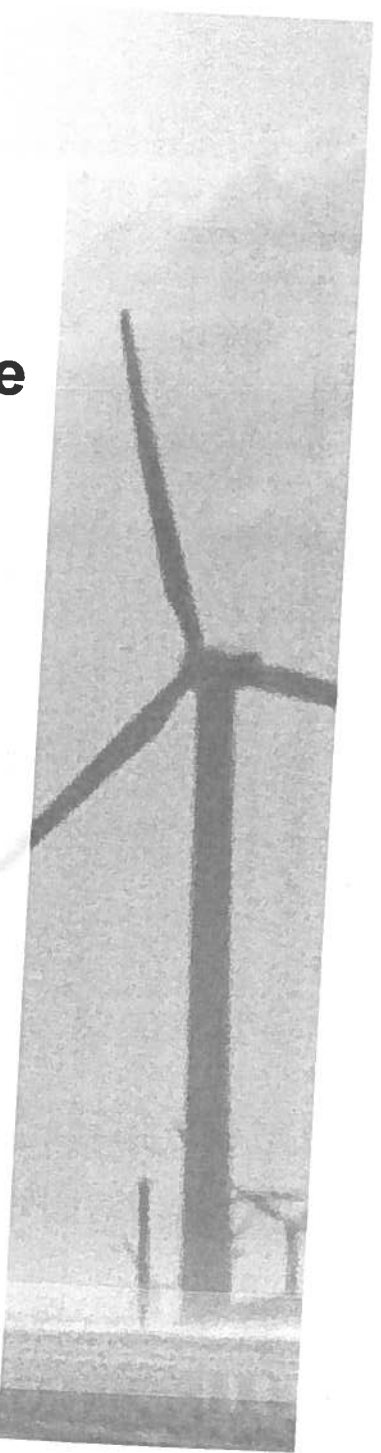
**Gas would need to permanently remain above ~\$12/MWh for unsubsidized MI wind to be of any value as a hedge.**

**Further:**

**Wind promoters would have us believe that it is the “wind” part of the “20 year wind PPA” that brings any “hedge” value.**

**But it’s the “20 year” part of the contract that yields a theoretical hedge, not the underlying wind technology.**

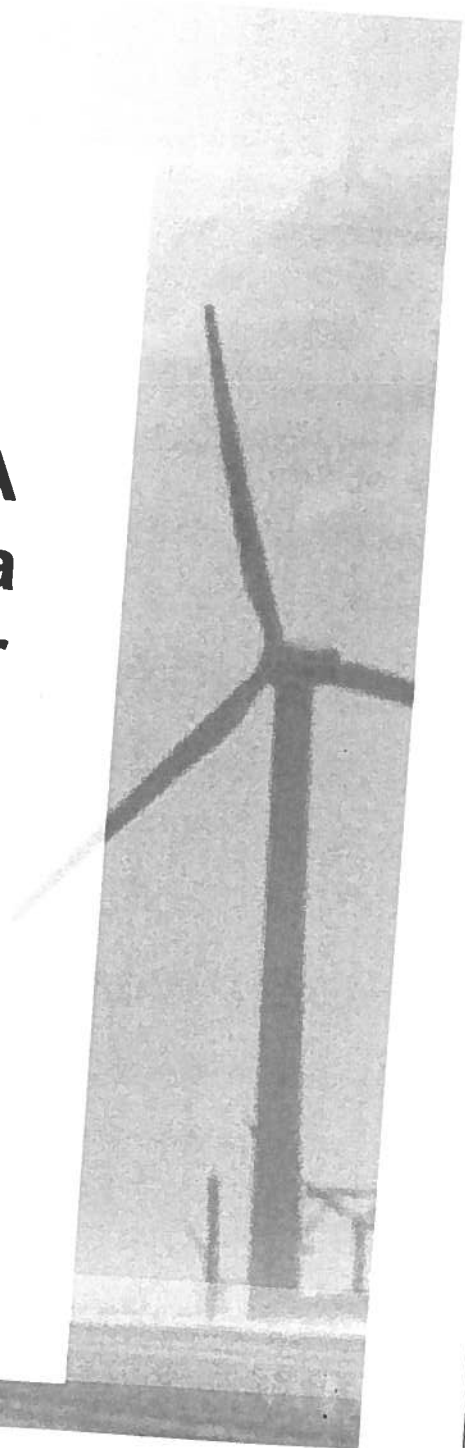
**Worse, what kind of gas price hedge requires you to commit to purchasing 2 units of gas at market price?**



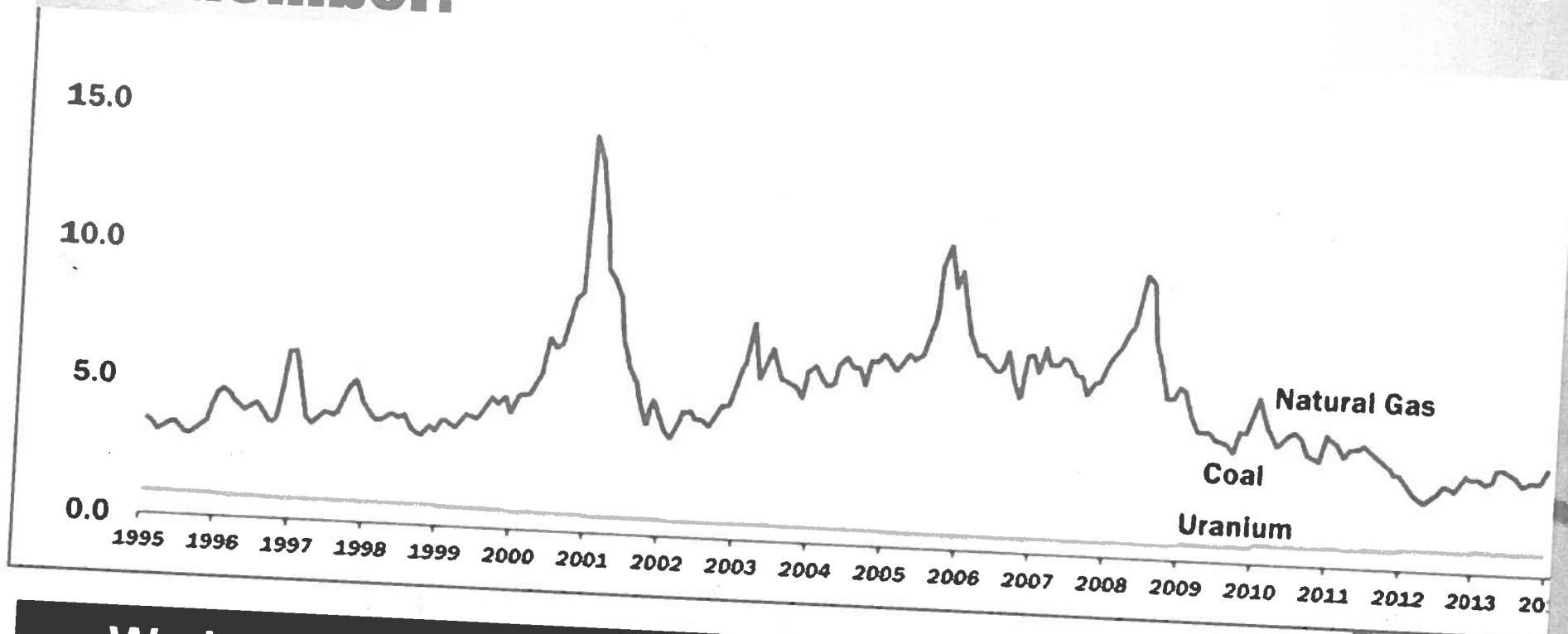


**And:**

**I would argue that if a 20 year wind PPA at \$80/MWh is somehow “valuable” as a gas price hedge then a 20, 30 or 40 year PPA for Illinois nuclear or Canadian hydro at, say, \$50-60/MWh, would be superior.**



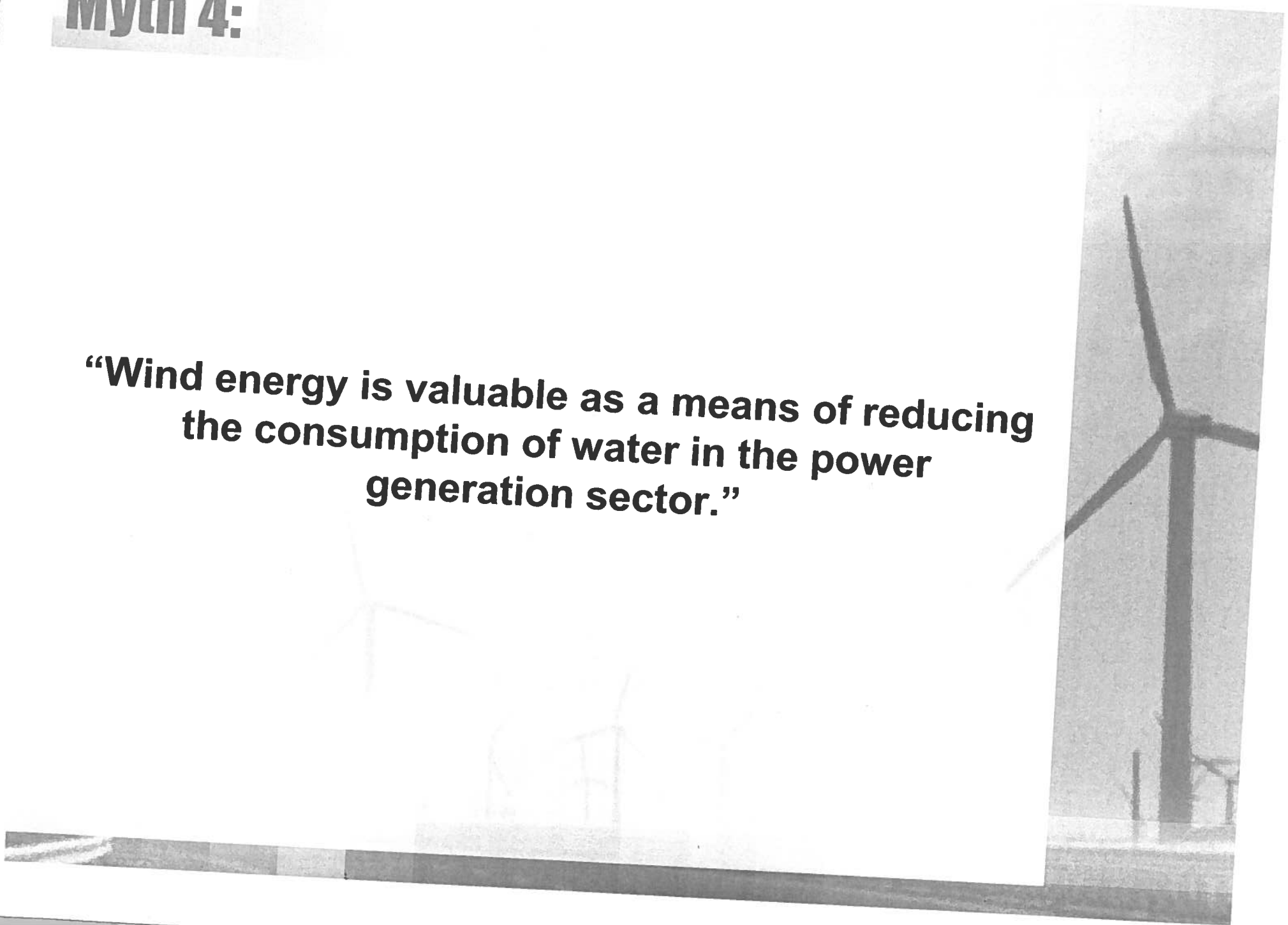
## Remember:



**We have 2 price stable fuels now, coal and uranium. The special interests who wish to increase MI's wind penetration as a gas price hedge also want to deny us access to our 2 most price stable fuels, leaving us dependent upon only renewables and volatile gas.**

## **Myth 4:**

**“Wind energy is valuable as a means of reducing the consumption of water in the power generation sector.”**



# Water consumption vs. Water Use:

The thermoelectric power sector in MI does withdraw a lot of surface water...

Table 2. Water withdrawals by major user categories in Michigan, 2004, million gallons per day.

Type of use	Water source			Total
	Great Lakes	Inland Lakes and Streams	Ground Water	
Public supply	879.2	17.8	247.3	1,144.3
Industrial	426.6	113.0	89.1	628.7
Irrigation	5.0	98.3	187.0	290.3
Thermoelectric power	8,404.2	476.7	4.1	8,885.0
Domestic	-	-	250.3	250.3
<b>Total</b>	<b>9,715.0</b>	<b>705.8</b>	<b>777.8</b>	<b>11,198.6</b>

Source: Data reported in or calculated based on MDEG (2006).

[http://nrconservation.msu.edu/uploads/files/105/MSUE\\_BulletinWQ62\\_WaterWithdrawalsandWaterUseinMichigan.pdf](http://nrconservation.msu.edu/uploads/files/105/MSUE_BulletinWQ62_WaterWithdrawalsandWaterUseinMichigan.pdf)

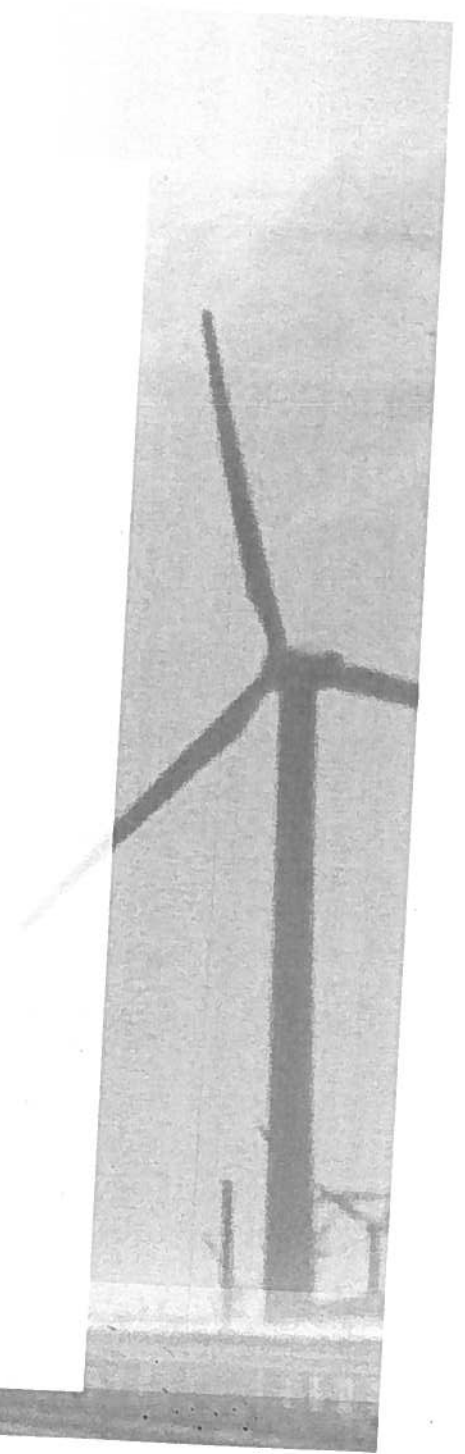
# Water consumption vs. water use:

....but it returns 98% of it to the source from which it is withdrawn.

Table 1. Consumptive-use coefficients by water-use category for the Great Lakes Basin

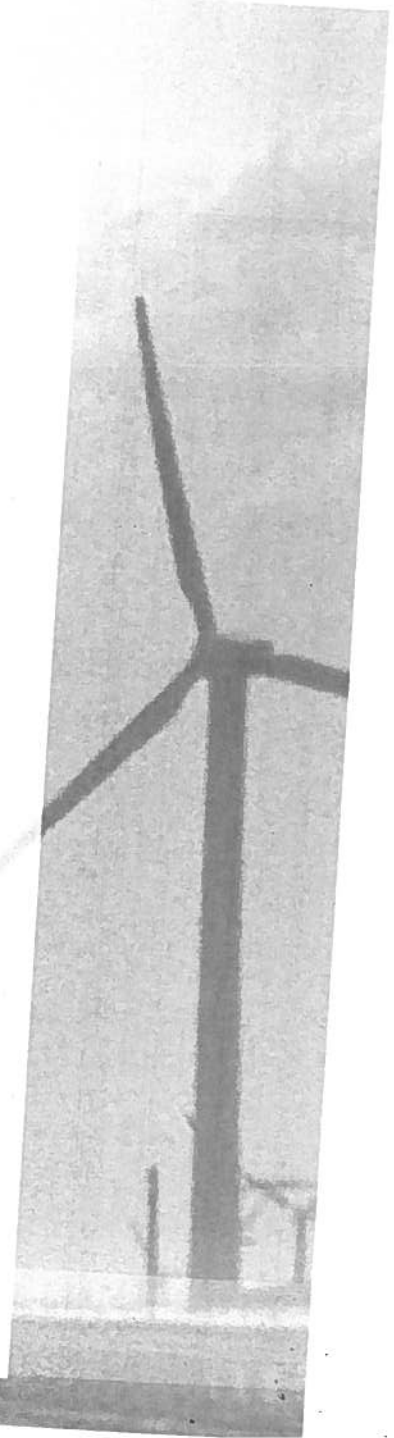
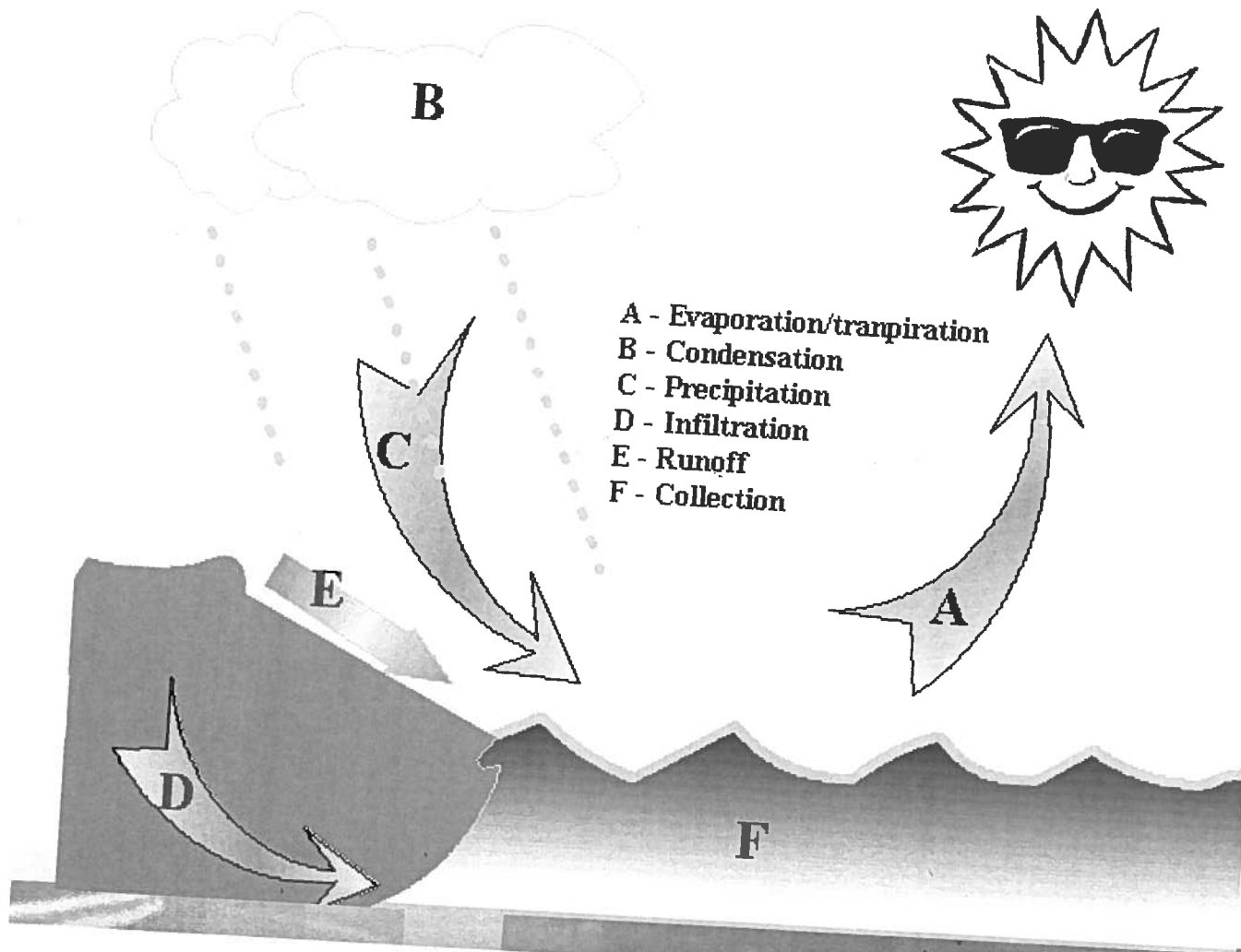
Water-use category	Median value (percent)	Range of values (percent)
Domestic and public supply	12	0-74
Industrial	10	0-35
Thermoelectric power	2	0-21
Irrigation	90	70-100
Livestock	83	0-100
Commercial	10	4-26
Mining	10	0-58

Source: Shaffer & Runkle, 2007



# What happens to the remaining 2%?

It evaporates, then condenses and turns into rain.



# Water consumption relative to supply:

The MI power sector withdraws 8.4 billion gallons of water per day.

But the Great Lakes contain 6 quadrillion gallons of water.

Thus the MI power sector withdraws only 0.00014% of the total volume of the Great Lakes per day and then returns 98% of it.

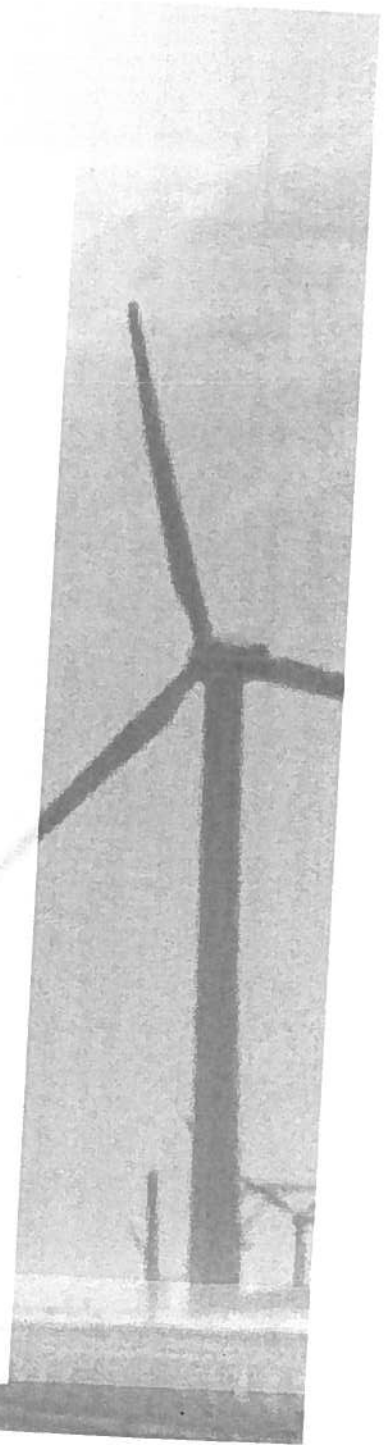
100 mi  
200 km

Copyright 2008 Geology.com



## **My point?**

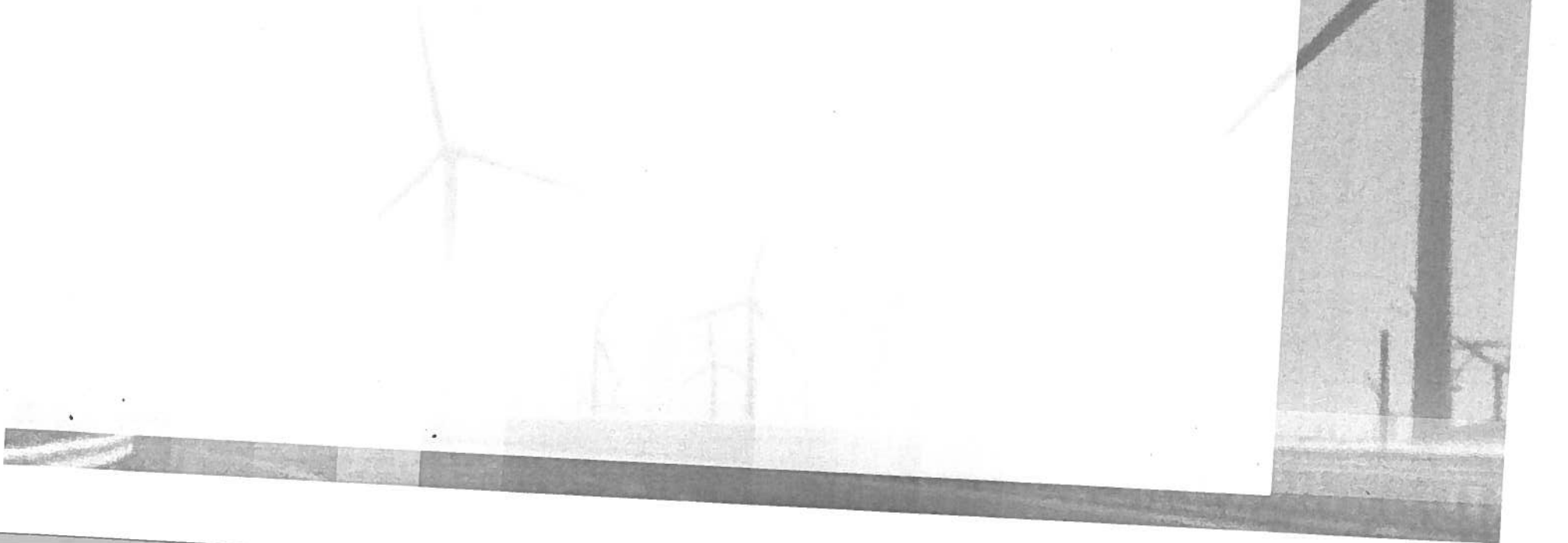
**Mandating wind energy as a means of protecting our water is selling an imaginary cure for a non-existent disease.**





## **Myth 5**

**“Wind mandates create jobs in a new economy.”**



# Wind mandates $\neq$ turbine jobs

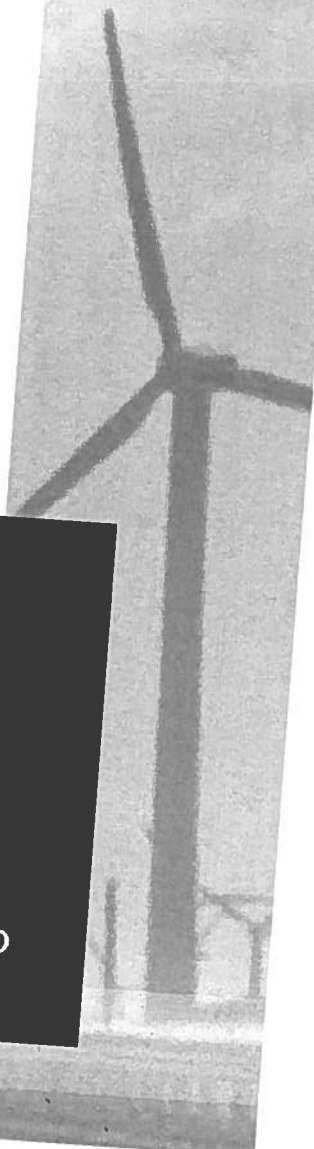
**AWEA reports that Ohio has more wind related manufacturing facilities than any other state in the nation despite having only a few hundred megawatts of installed wind capacity-far less than MI.**

**If installed wind turbines equal wind manufacturing facilities Texas and Iowa would lead that list, not Ohio.**

## Wind-Relating Manufacturing

The wind industry has over 550 manufacturing facilities producing products for the wind industry that range from blade, tower and turbine nacelle assembly facilities to raw component suppliers including fiberglass and steel.

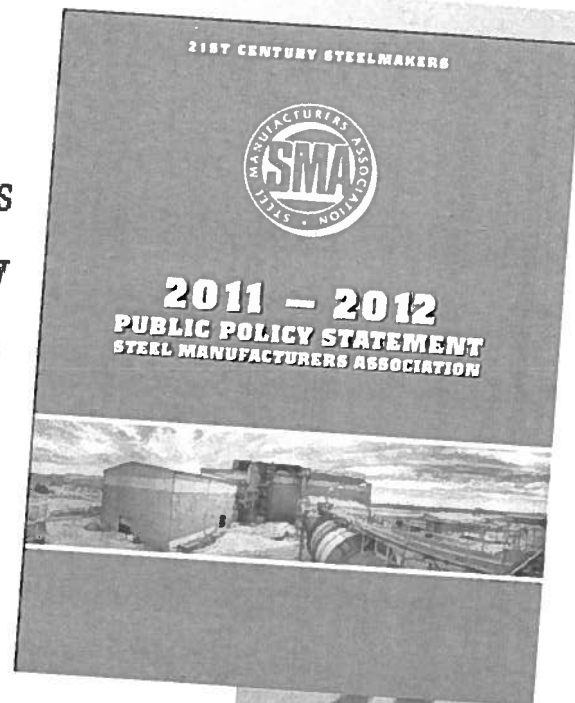
- **Number of manufacturing facilities in Ohio: 62 facilities. State Rank: Ohio is the top state in the nation based on the number of wind-related manufacturing facilities!**



# Cost side of ledger?

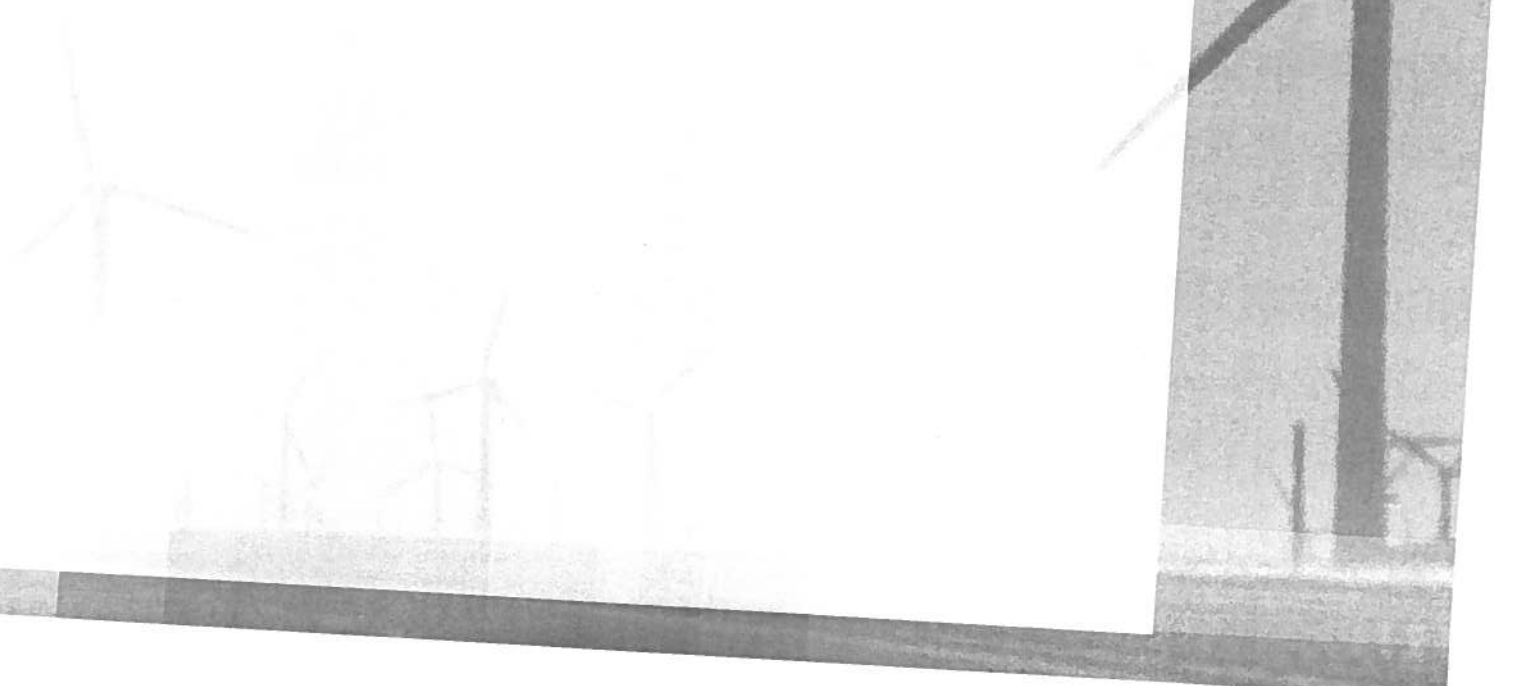
EAF-based steel production is an energy intensive process that requires reliable and economically competitive energy supplies. The US steel industry spends over \$18 billion annually for electricity, and energy constitutes up to 15 percent of the cost of steelmaking. At the same time, this process is exceptionally energy efficient compared to other steel-making methods employed world-wide.

**Just a 10% increase in electricity rates adds \$1.8 billion in costs to US steel industry alone. With 100,000 steel workers in the US, that is \$18,000.00/yr per employee no longer available for union wages and benefits. Our wind contracts at \$75/MWh are 2.5 times the 2014 MISO average wholesale price for electricity.**



## **Myth 6**

**“The Clean Power Plan requires us to build renewables to cost effectively reduce emissions.”**



# MISO analysis of draft Clean Power Plan:

## Reference case & Phase 1 scenarios

Scenario	EPA Assumptions and Methodology	Cost per ton of CO <sub>2</sub> reduction (\$/ton) *
Reference Case	MISO's MTEP-15 Business As Usual future assumptions**	-
Building Block 1	In 2020, apply a 6% heat rate improvement to all the coal-fired units at a capital cost of \$100/kW (amortized over 10 years).	5
Building Block 2	Calculate and enforce, starting in 2020, a minimum fuel burn for existing CC units to yield an annual 70% capacity factor.	53
Building Block 3	Calculate and add the equivalent amount of wind MWs to meet the incremental regional non-hydro renewable target.	237
Building Block 4	Calculate the amount of energy savings for the MISO footprint and incorporate it as a 20-year EE program in the model.	70
All Building Blocks	Application of all building blocks.	60
CO <sub>2</sub> Constraint	Application of a mass-based CO <sub>2</sub> reduction target, allowing the model to optimize.	38

Present value calculation for costs is the driver for the higher cost.

\* The cost per ton of CO<sub>2</sub> reduction is indicative – actual values may vary depending on different input assumptions, etc.  
 \*\* Assumptions matrix is available at <https://www.misoenergy.org/Events/Pages/PAC20140820.aspx>

# MISO: wind component is most \$... by far

## Reference case & Phase 1 scenarios

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# EE program is 2<sup>nd</sup>. most expensive block:

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Present value calculation for costs is the driver for the higher cost.

# Aggregate for all 4 blocks:

## Reference case & Phase 1 scenarios

Scenario	EPA Assumptions and Methodology	Cost per ton of CO <sub>2</sub> reduction (\$/ton) *
Reference Case	MISO's MTEP-15 Business As Usual future assumptions**	-
Building Block 1	In 2020, apply a 6% heat rate improvement to all the coal-fired units at a capital cost of \$100/kW (amortized over 10 years).	5
Building Block 2	Calculate and enforce, starting in 2020, a minimum fuel burn for existing CC units to yield an annual 70% capacity factor.	53
Building Block 3	Calculate and add the equivalent amount of wind MWs to meet the incremental regional non-hydro renewable target.	237
Building Block 4	Calculate the amount of energy savings for the MISO footprint and incorporate it as a 20-year EE program in the model.	70
All Building Blocks	Application of all building blocks.	60

Present value calculation for costs is the driver for the higher cost.

By using the building block approach we see that the aggregate cost of reducing CO<sub>2</sub> emissions is \$60/ton. Note: in 2010 the Obama administration was valuing CO<sub>2</sub> at just under \$22/ton for rule evaluation purposes.



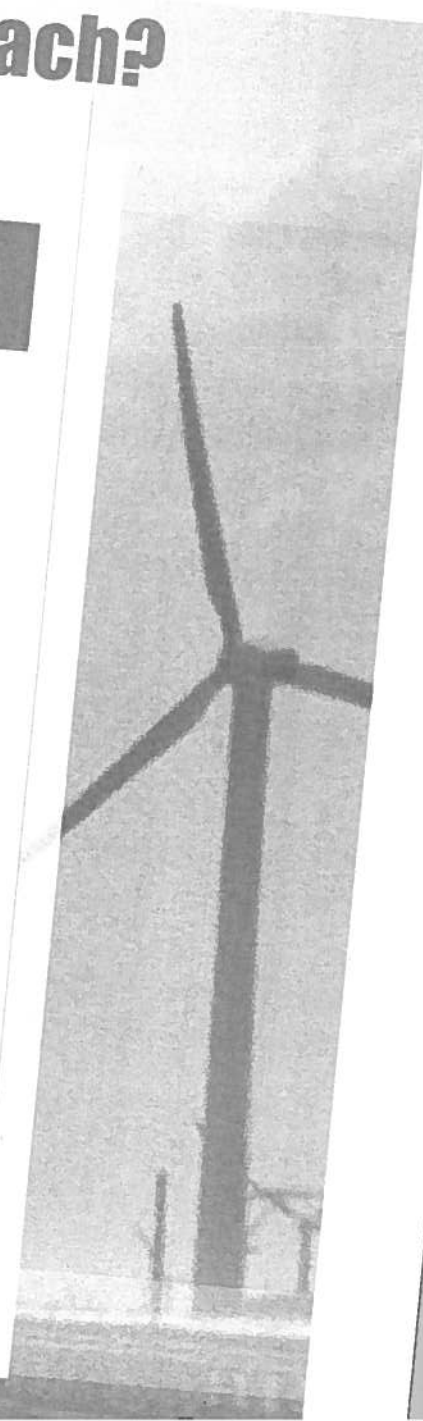
# What of the alternative mass-based approach?

## Reference case & Phase 1 scenarios

Scenario	EPA Assumptions and Methodology	Cost per ton of CO <sub>2</sub> reduction (\$/ton) *
Reference Case	MISO's MTEP-15 Business As Usual future assumptions**	-
Building Block 1	In 2020, apply a 6% heat rate improvement to all the coal-fired units at a capital cost of \$100/kW (amortized over 10 years).	5
Building Block 2	Calculate and enforce, starting in 2020, a minimum fuel burn for existing CC units to yield an annual 70% capacity factor.	53
Building Block 3	Calculate and add the equivalent amount of wind MWs to meet the incremental regional non-hydro renewable target.	237
Building Block 4	Calculate the amount of energy savings for the MISO footprint and incorporate it as a 20-year EE program in the model.	70
All Building Blocks	Application of all building blocks.	60
CO <sub>2</sub> Constraint	Application of a mass-based CO <sub>2</sub> reduction target, allowing the model to optimize.	38

\* The cost per ton of CO<sub>2</sub> reduction is indicative – actual values may vary depending on different input assumptions, etc.  
\*\* Assumptions matrix is available at <https://www.misoenergy.org/Events/Pages/PAC20140820.aspx>

**MISO analysis concludes that simply using the mass-based CO<sub>2</sub> reduction target permitted under 111(d) yields the greater ratepayer benefit: \$38/ton versus \$60/ton.**



# Observation:

## Reference case & Phase 1 scenarios

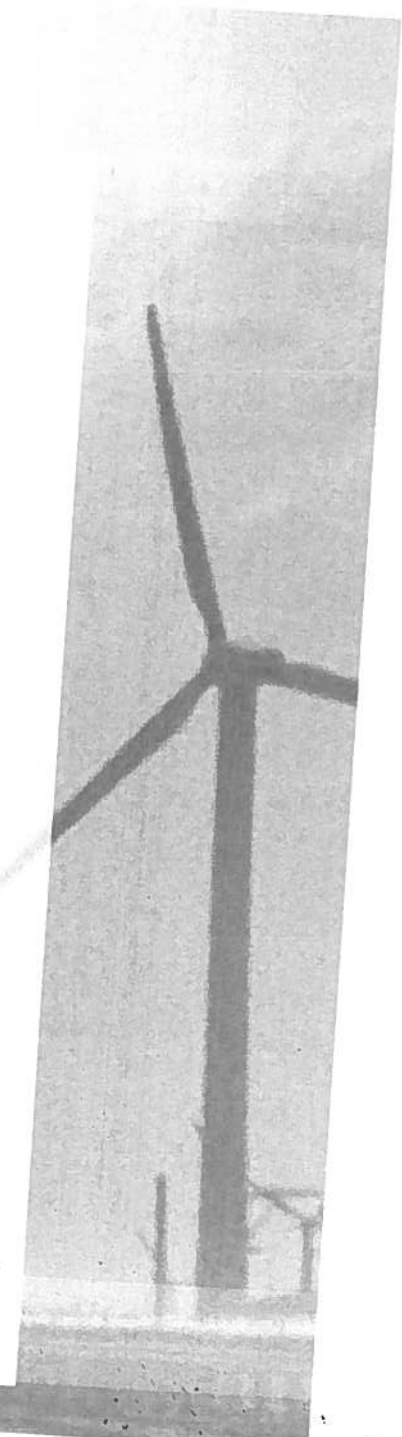
Scenario	EPA Assumptions and Methodology	Cost per ton of CO <sub>2</sub> reduction (\$/ton) *
Reference Case	MISO's MTEP-15 Business As Usual future assumptions**	-
Building Block 1	In 2020, apply a 6% heat rate improvement to all the coal-fired units at a capital cost of \$100/kW (amortized over 10 years).	5
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Present value calculation for costs is the driver for the higher cost.

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The most expensive parts of the CPP building blocks mirror our own "CPP" - PA295.

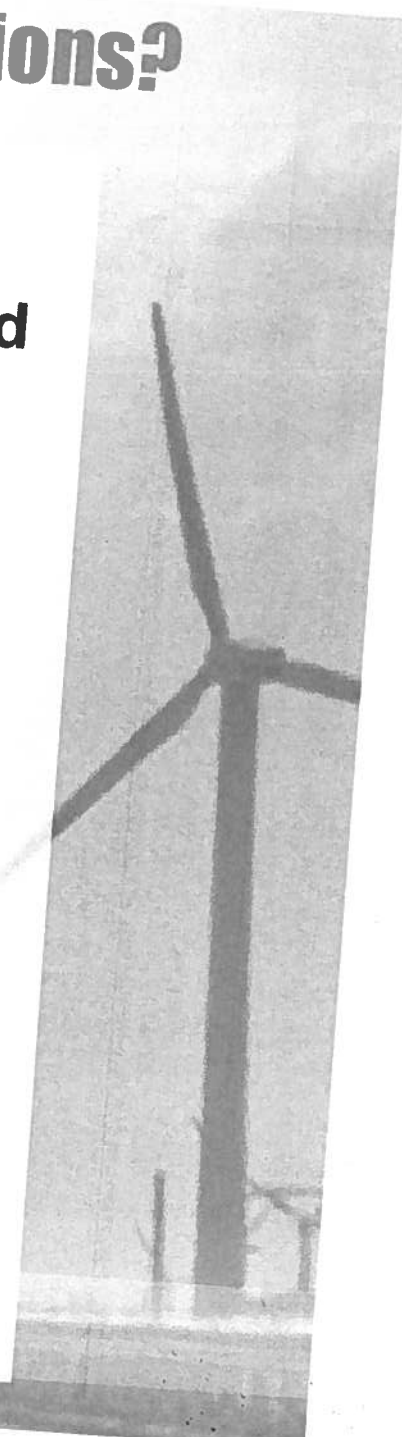


## **And what about health impacts from emissions?**

**Michigan has constructed \$3 billion worth of wind turbines which roughly function as a 450MW intermittent generator.**

**Assuming this wind generation only displaced MI coal generation, that expenditure would reduce coal plant emissions by 7%- but probably much less.**

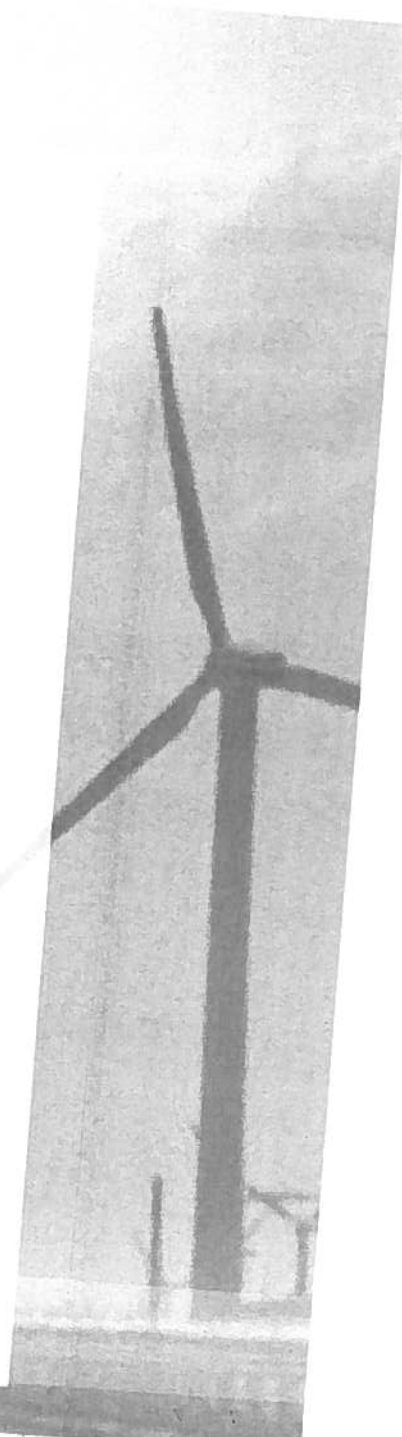
**\$3 billion worth of new CCGT would have cut statewide HG and PM2.5 emissions by 50% and CO2 emission by 25%.**



# **Conclusion:**

**If the Michigan wind mandate could deliver on only 1 or 2 of the 6 pervasive myths I have outlined above it may be worth continuing.**

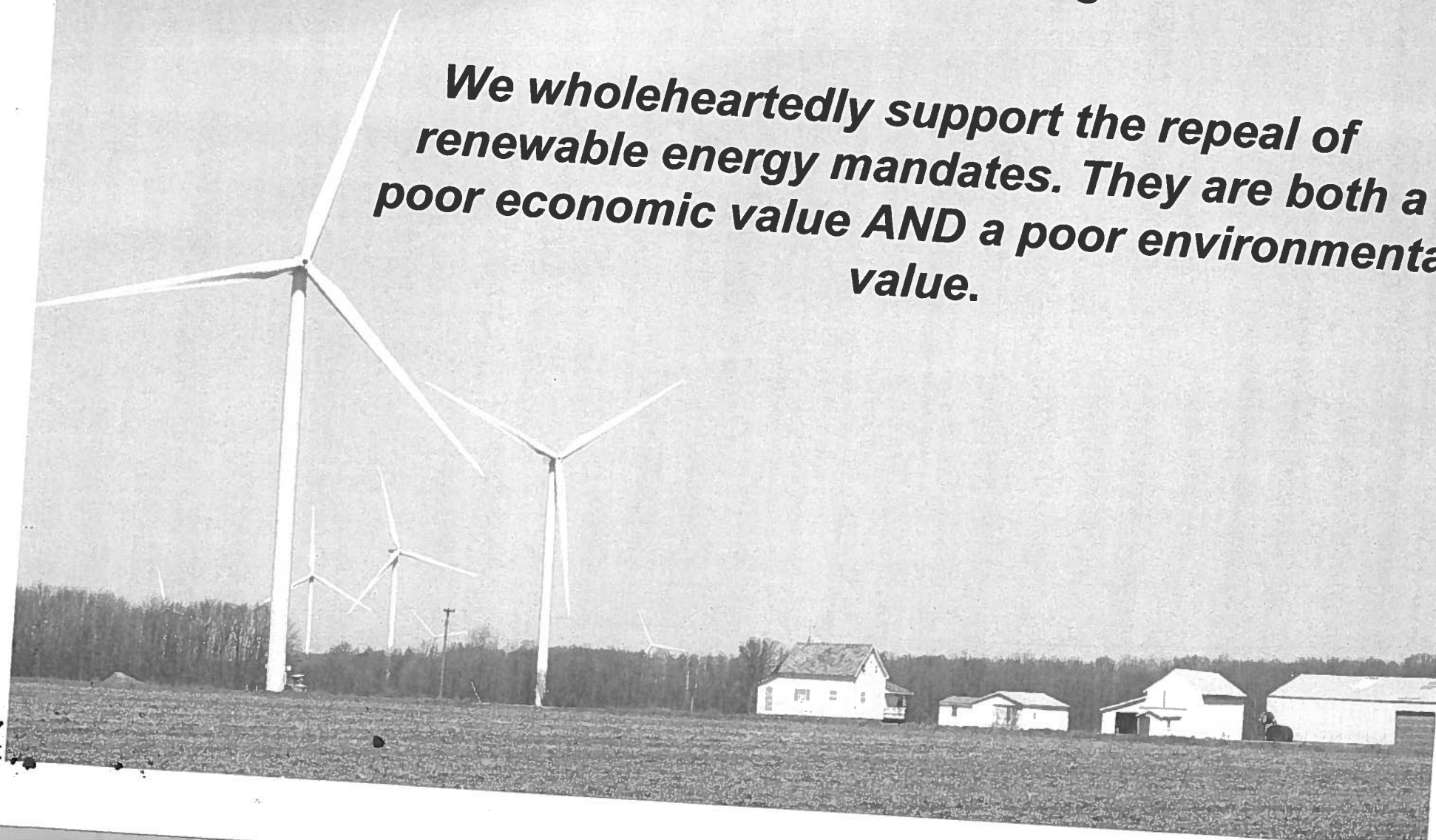
**But it cannot deliver on those claims.**



# **The IICC's humble request:**

**Michigan's bipartisan supporters of the IICC send  
a simple message:**

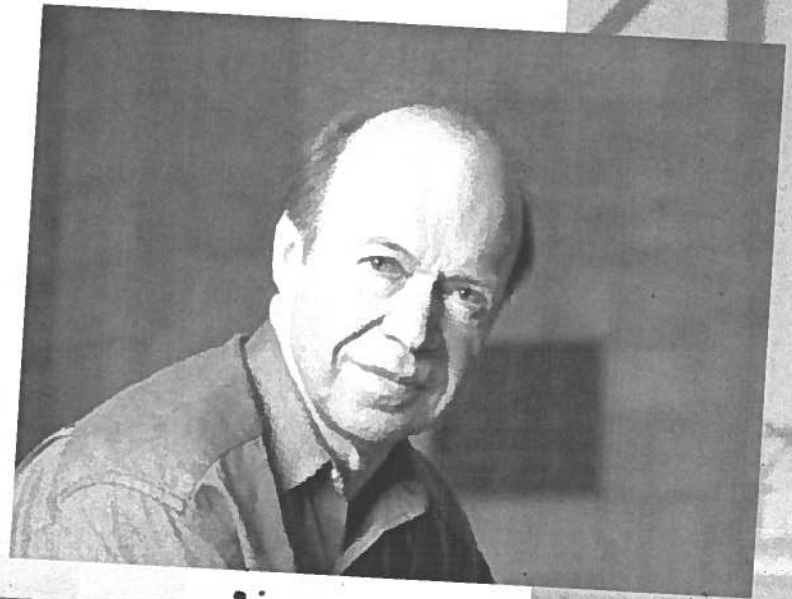
***We wholeheartedly support the repeal of  
renewable energy mandates. They are both a  
poor economic value AND a poor environmental  
value.***



# Questions:

**“Suggesting that renewables will let us phase rapidly off fossil fuels in the United States, China, India, or the world as a whole is almost the equivalent of believing in the Easter Bunny and Tooth Fairy.”**

**-Climate Scientist James Hansen**



## **Questions:**

**Mr. Kevon Martis**

**BA-University of MI-1989  
Lenawee County Rural Land Use  
Committee-vice-chairman-2007-09  
Riga Township Planning  
Commission-Vice-chairman 2005-  
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**Interstate Informed Citizen's  
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